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INFLUENCE OF FERTILIZERS SYSTEM ON STABILITY OF NITROGEN FUND IN LEACHED BLACK SOIL

Використання мінеральної системи удобрення дестабілізувало азотний фонд чорнозему типового вилугуваного. Впродовж 3 років вміст загального азоту в орному 0-30-см шарі зменшився до початкового на 6-7 мг/100 г ґрунту. Стабільність вмісту загального азоту в ґрунті спостерігалась за поєднання внесення на 1 га ланки сівозміни $N_{50}P_{20}K_{30}$ + 13,3 т гною та $N_{50}P_{20}K_{30}$ + сидерат + побічна продукція. Порівняно з контролем без добрив, органо-мінеральні системи удобрення забезпечили зростання вмісту азоту в усіх фракціях азотовмісних сполук ґрунту: легкогідролізованого азоту – на 1,5-2,4, важкогідролізованого – 1,5,-2,6; негідролізованого залишку – 1,1-1,9 мг/100 г ґрунту.

Ключові слова: азотний фонд, чорнозем типовий вилугуваний легкосуглинковий, ланка сівозміни, система удобрення.

Introduction. Stability of nitrogen fund in black soils becomes an underground of sustainable agricultural. Total nitrogen reserves in the soil to I.V. Tiurin mind [4] it is possible to consider as a main index of its potential fertility, but quantity of nitrogen are used by plants during a year – conventional unit of actual fertility.

Effective way to influence on nitrogen regime of soil becomes application of mineral and organic fertilizers. Manure application strengthens the immobilization processes in the soil and contributes to the stability of organic nitrogen content [3]. According to the investigations of G.P. Gamzikov [1] during first year of manure application the plants use of its composition about 20-30% of nitrogen, other 40% is immobilized, 20-30% are lost and about 10% are used by plants in aftereffect next year.

Application of technical nitrogen of fertilizers violates the natural balance between processes of immobilization-mineralization, causes additional mobililization of soil nitrogen, and increases unproductive nitrogen losses as a result of infiltration and emission [6]. To the opinion of the most scientists the optimal system of fertilizers which provides stability of nitrogen fund of the soil, causes optimal regime of organic matter mineralization and creates favorable regime nitrogen nutrition of plants becomes organic-mineral system of fertilizers [2], [4], [7].

Investigation purpose is to study the influence of traditional and alternative with elements of biologization system of fertilizers on stability nitrogen fund of the leached black soil while growing crops in crops rotation with peas.

Materials and investigation methods. Investigations were carried out in the conditions of stationary experiment (2006-2010 years) of Uladovo-Liulinetska research-selection station on leached black soil, loamy texture in the conditions of sufficient moisture of Forest-Steppe Zone of Ukraine.

Agrochemical and physic-chemical characteristic of topsoil (0-30 cm): organic matter content (for Turin) – 4,0%, mobile phosphoric and potassium (for Chirikov) reciprocally – 140 та 75 mg/kg soil; pH_{KCl} – 5,9; hydrolytic acidity (for Kappen) – 2,2 mg на 100 g of soil.

Site drilled area – 150 м^2, accounting area – 100 м^2, repetition – four-times. Investigation was made in rotation chain: peas – winter wheat – sugar beet. Crops growing agrotechnique was common for zone.

Fertilizers used: ammonium nitrate, superphosphate, potassium chloride. Organic fertilizers were applied in form of manure (13,3 t per 1 ha of field) and alternative sources of organic matter – postharvest green manure crop white mustard (medium yield – 25 t/ha) and by-products of plants: leaves of sugar beet, straw of peas and winter wheat.

Ammonium and nitrate nitrogen in the soil were determined for TSINAO methodic; nitrogen of organic compounds in soil for method of two-steps acid hydrolyze under E.A. Andreieva, G.M. Shcheglovym.

Investigation results ant their discussion. Investigations showed that application mineral system of fertilizers by applying per one hectare of rotation chain recommended $N_{50}P_{20}K_{30}$ and increased $N_{66,7}P_{26,7}K_{40}$ norms of fertilizers was insufficient to get stability of nitrogen fund of leached black soil. On completion the rotation chain the content of total nitrogen in arable 0-30 cm layer of soil decreased to initial – reciprocally on 7 and 6 mg/100 g of soil. Increase in recommending rate of fertilizers the

norm one of the nutrients in 1,5 times maintained a negative trend of the content of total nitrogen in the soil. Destabilization of nitrogen fund of leached black soil could be caused by low norm of nitrogen fertilizers application and increasing mineralization of organic nitrogen fractions in the soil (table 1).

Using manure (13,3 t/ha rotation chain), green manure white mustard and combination of applying fertilizers and white mustard ($N_{50}P_{20}K_{30}$ + green manure per 1 ha of rotation chain) associated with a trend to decrease the content of total nitrogen in arable layer of soil on 4-5 mg/100 g of soil and preserved the stability of nitrogen fund in subsurface 30-40 cm layer. This indicates a low rate of nitrogen application with pointed fertilizers.

The highest stability of nitrogen fund of leached black soil, loam texture provided organic-mineral systems of fertilizers which provided a combination of applying fertilizers and manure ($N_{50}P_{20}K_{30}$ + 13,3 t manure per 1 ha rotation chain) or fertilizers in combination with green manure white mustard and by-products ($N_{50}P_{20}K_{30}$ + green manure + by-products per 1 ha rotation chain). On completion of rotation chain the content of total nitrogen in pointed variants was in topsoil – 236, subsurface – 221-224 mg/100 g of soil that corresponded to the nitrogen content in the soil at the beginning of rotation chain.

Systems of fertilizers influenced the distribution of nitrogen in fractions of nitrogen-containing compounds in the soil. In variant without fertilizers on the completion rotation chain the content of organic nitrogen in topsoil (0-30 cm) was 229 mg/100 g of soil (99,6% of the total content), including easy-hydrolyzed nitrogen – 47,2, heavy-hydrolyzed – 88,6, non-hydrolyzed – 93,2 mg/100 g of soil, or reciprocally 20,6%, 38,7% and 40,7% of sum of fractions (table 2).

Mineral system of fertilizers and using for fertilizer of green manure white mustard did not significantly changed the distribution of nitrogen in nitrogen-containing fractions of the soil in comparing with control without fertilizers.

Combining application fertilizers and use for fertilizer green manure white mustard ($N_{50}P_{20}K_{30}$ + green manure per 1 ha of rotation chain) or applying 13,3 t manure per 1 ha of rotation chain increased the content of easy-hydrolyzed fraction of nitrogen in comparing with control without fertilizers – reciprocally 1,9 and 1,8 mg/100 g of soil. Increase the content of easy-hydrolyzed nitrogen in the soil while using for fertilizer white mustard was pointed in the research of Ya.P. Tsvey, F.P. Kacianchuk [5].

Table 1 – **Influence of fertilizers system on content of total nitrogen in leached black soil,** mg/100 g of soil, ULRSS (2006-2010 years)

№ variant	Applied fertilizers on 1 ha of rotation chain	Soil layer, cm					
		0-30	30-40	0-30	30-40	0-30	30-40
		beginning of chain, 2006-2008 years		finishing of chain, 2008-2010 pp.		± to beginning	
1	Without fertilizers (control)	237	221	230	218	-7	-3
3	$N_{50}P_{20}K_{30}$	238	224	231	222	-7	-2
15	$N_{73,3}P_{20}K_{30}$	236	222	229	220	-7	-2
18	$N_{50}P_{30}K_{30}$	238	223	231	220	-7	-3
20	$N_{50}P_{20}K_{43,3}$	237	222	230	220	-7	-2
4	$N_{66,7}P_{26,7}K_{40}$	237	222	231	220	-6	-2
5	$N_{50}P_{20}K_{30}$ + 13,3 t/ha manure	236	223	236	224	0	1
6	13,3 t/ha manure	236	222	232	222	-4	0
10	Green manure (white mustard)	237	221	232	220	-5	-1
11	$N_{50}P_{20}K_{30}$ + green manure	236	220	232	220	-4	0
12	$N_{50}P_{20}K_{30}$ + green manure + by-products	235	220	236	221	1	1
NIR_{05}		6,0	5,7	5,9	5,4	-	-
P, %		1,8	1,6	1,7	1,5	-	-

The systems of fertilizers which provided the combining application of fertilizers and manure or fertilizers in combination with green manure white mustard and by-products were the most effective. Their application increased the content of nitrogen in all fractions of nitrogen-containing compounds in the soil. Combining application of $N_{50}P_{20}K_{30}$ + 13,3 t manure per 1 ha of rotation chain increased the content of easy-hydrolyzed nitrogen to control without fertilizers on 2,4, heavy-hydrolyzed – 1,5, non-hydrolyzed residue – 1,1; $N_{50}P_{20}K_{30}$ + green manure + by-products per 1 ha of rotation chain – reciprocally on 1,5, 2,6 and 1,9 mg/100 g of soil.

Table 2 – **Influence of fertilizers system on content of nitrogen fractions in arable layer of leached black soil**, mg/100 g of soil, ULRSS (2008-2010 years)

№ variant	Applied fertilizers on 1 ha of rotation chain	Content of mineral nitrogen	Fractions of organic nitrogen			
			sum of fractions	including		
				easy-hydrolyzed	heavy-hydrolyzed	non-hydrolyzed
1	Without fertilizers (control)	1,1	229	47,2	88,6	93,2
3	$N_{50}P_{20}K_{30}$	1,6	229	48,0	87,9	93,1
5	$N_{50}P_{20}K_{30}$ + 13,3 t/ha manure	1,7	234	49,6	90,1	94,3
6	13,3 t/ha manure	1,3	231	49,0	88,1	93,9
10	Green manure (white mustard)	1,1	231	48,5	88,7	93,8
11	$N_{50}P_{20}K_{30}$ + green manure	1,4	231	49,1	88,3	93,6
12	$N_{50}P_{20}K_{30}$ + green manure + + by-products	1,1	235	48,7	91,2	95,1
NIR_{05}		0,1	6,8	1,6	2,3	2,6
P, %		1,6	1,8	1,7	1,7	1,8

Thus, the use traditional on the ground of manure organic-mineral system of fertilizers and combining application fertilizers, green manure white mustard and by-products contributed the stability of nitrogen fund of leached black soil.

Conclusions.

1. Use mineral system of fertilizers ($N_{50\text{-}66,7}P_{20\text{-}26,7}K_{30\text{-}40}$ per 1 ha of rotation chain) during three years decreased the content of total nitrogen in topsoil (0-30 cm) to initial on 6-7 mg/100 g of soil. Decrease took place at the expense of all fractions of nitrogen-containing compounds in the soil.

2. Applying manure (13,3 t/ha rotation chain) and combining application of fertilizers and green manure white mustard ($N_{50}P_{20}K_{30}$ + green manure per 1 ha of rotation chain) caused the downward trend of total nitrogen content in topsoil on 4-5 mg/100 g of soil that was mainly due to nitrogen of heavy-hydrolyzed fractions.

3. The stability of total nitrogen content in leached black soil was observed when combined application chain of $N_{50}P_{20}K_{30}$ + 13,3 t manure and $N_{50}P_{20}K_{30}$ + green manure + by-products per 1 ha of rotation. In comparing to control without fertilizers the organic-mineral systems of fertilizers provided the increase of all fractions nitrogen-containing compounds in the soil: easy-hydrolyzed on 1,5-2,4, heavy-hydrolyzed – 1,5,-2,6, non-hydrolyzed residue – 1,1-1,9 mg/100 g of soil.

LITERATURE

1. Гамзиков Г.П. Азот в земледелии в Западной Сибири / Г.П. Гамзиков. – М.: Наука, 1981. – 267 с.

2. Гетманец А.Я. Азот в земледелии чернозёмной зоны / А.Я. Гетманец // Агрохимия. – 1977. – № 7. – С. 3-10.

3. Мишустин Е.П. Азот в природе и плодородие почве / Е.П. Мишустин. – Изв. АН СССР. – Сер. биол., 1972. – № 1. – С. 5-12.

4. Тюрин И.В. Почвообразовательный процесс, плодородие почвы и проблема азота в почвоведении и земледелии / И.В. Тюрин // Почвоведение. – 1965. – № 3. – С. 1-17.

5. Цвей Я.П. Використання пожнивної гірчиці при вирощуванні цукрових буряків / Я.П. Цвей, Ф.П. Касянчук // Цукрові буряки. – 2004. – № 3. – С. 14-15.

6. Шиян П.Н. Изучение трансформации азота аммиачной селитры в черноземе выщелоченном под сахарной свеклой / П.Н. Шиян, В.М. Бондаренко // Почвоведение. – 1990. – № 11. – С. 104-115.

7. Юрко В.П. Формы азотосодержащих соединений в почвах Украины / В.П. Юрко // Круговорот и баланс азота в системе почва-удобрения-растения-вода. – М.: Наука, 1979. – С. 152-155.

Влияние системы удобрения на стабильность азотного фонда чернозема типичного выщелоченного

В.В. Иванина, Н.К. Шиманская, Г.Н. Мазур

Применение минеральной системы удобрения дестабилизировало азотный фонд чернозема выщелоченного. В течение 3 лет содержание общего азота в пахотном 0-30-см слое уменьшилось к начальному на 6-7 мг/100 г почвы. Стабильность содержания общего азота в почве наблюдалась при сочетании внесения на 1 га звена севооборота $N_{50}P_{20}K_{30}$ + 13,3 т навоза и $N_{50}P_{20}K_{30}$ + сидерат + побочная продукция. По сравнению с контролем без удобрений, органоминеральные системы удобрения обеспечили увеличение содержания азота во всех фракциях азотсодержащих соединений почвы: легкогидролизованного азота – на 1,5-2,4; трудногидролизованного – 1,5,-2,6; негидролизованного остатка – 1,1-1,9 мг/100 г почвы.

Ключевые слова: азотный фонд, чернозем типичный выщелоченный, звено севооборота, система удобрения.

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IN VITRO REGENERATION INTRODUCTION IN DORMANCY STATE AS A WAY OF POST-ACEPTIC ADAPTATION

За використання культури тканин у розмноженні рослин дуже важливою та відповідальною є проблема їх постасептичної адаптації, тому що за посадки неадаптованого матеріалу втрати можуть становити до 100 %. Водночас, у природі відомий такий спосіб пристосування рослин для уникнення несприятливих факторів як входження рослин у стан спокою. Вивчаючи ефективність введення *in vitro* у стан спокою регенерантів двох філогенетично віддалених видів (*Solanum tuberosum* та *Hosta*), встановлено ефективність цього прийому. Рослини картоплі сортів Подолянка і Червона рута, що пройшли стан спокою, мали довший вегетаційний період та забезпечували вищу урожайність. У регенерантів хости сорту Паульс Глорі з розсади без кореня прижилося 37,8 % рослин, приживлюваність розсади із коренем становила 56,6 % і найбільший відсоток приживлюваності (87,2 %) становив у варіанті з рослинами, які пройшли стан спокою. Подібна закономірність встановлена й по сорту Патріот.

Таким чином, на рослинах картоплі та хости встановлено позитивний вплив введення регенерантів *in vitro* у стан спокою на постасептичну адаптацію.

Ключові слова: культура тканин, розсада, адаптація, *Solanum tuberosum, Hosta*.

Cloned micro propagation allows you to rapidly propagate plants almost all species of the multiplication factor 1 to 1000 and more [1]. Obtained biological material is planted after *in vitro* in natural conditions or under glass in the form of seedlings. This method is convenient and easy to use. However, despite the advantages it has some weaknesses. Namely, it's impossible to pursue a gradual (during the year) material accumulation; seasonality and availability of peak periods; the cost of creating a microclimate; non compact and significant injury during transport. A seedling after planting requires a certain period of engraftment and acclimatization *in vitro.* During this time loss of regenerated plants can be 50-100% [2, 3].

It's connected with the fact that the conditions which are formed in aseptic autotrophic cultivation, such as low water potential of nutrient (ten times lower soil), high humidity, transpiration intensity is close to zero [4] leads to a loss of stomata ability [5]. With a sharp movement of plants *in vitro* to natural intensity reaches a very high level, which can cause loss of 100% of seedlings [6]. So, the problem of rehabilitation of the natural conditions remains relevant.

At the same time, in nature are known mechanisms the occurrence of plants dormancy, which allow us to overcome the adverse conditions and start the life cycle of plants from the beginning in the form of a new organism: seeds or unit of vegetative reproduction. Germination of seeds and tubers begins with the first stage of organogenesis and during the life cycle of plants are adapting to environmental conditions. As it well known, conditions determine the peculiarities of the formation of organs and tissues of the growing organism, in which laid the adaptation for these conditions [7]. Searching of methods of using the rest of plants-regeneration, which would improve the post-aseptic adaptation, were the aim of our research.

Research methods. For research were cultured *in vitro* two phylogenetically distant species of plants, such as *Solánum tuberósum* (varieties of the Podolyanka and The Chervona Ruta) and *Hosta* (varieties of the Patriot, Pauls Glori). We used nutrient medium of Murashige and Skoog. We sampled of 30 plants. Post-aseptic cultivation was carried out on substrate in a humid chamber.

Results and discussion. For such types of material we need different conditions of cultivation cuttings, different time, different costs of electricity and consumables. One or another method of accelerated reproduction is characterized by such a quantity as the multiplication factor. For example, one test-tube plant of potato in propagation by cuttings for approximately 1 month, you can get 5-7 regenerated plants, two months - 30-40 plants, for the three months - 150-200, for four - months 450-550 plants and 10 months - more than half a million plants. In case of receipt of micro tubers this figure will be about 4-5 times less because one test-tube plant depending on the type of plant 1,3 - 2,1 pcs micro tubers [8]. For almost a lack of seasonality in production multiplication factor is also directly correlated with the period of cultivation of regenerator (Fig.1).

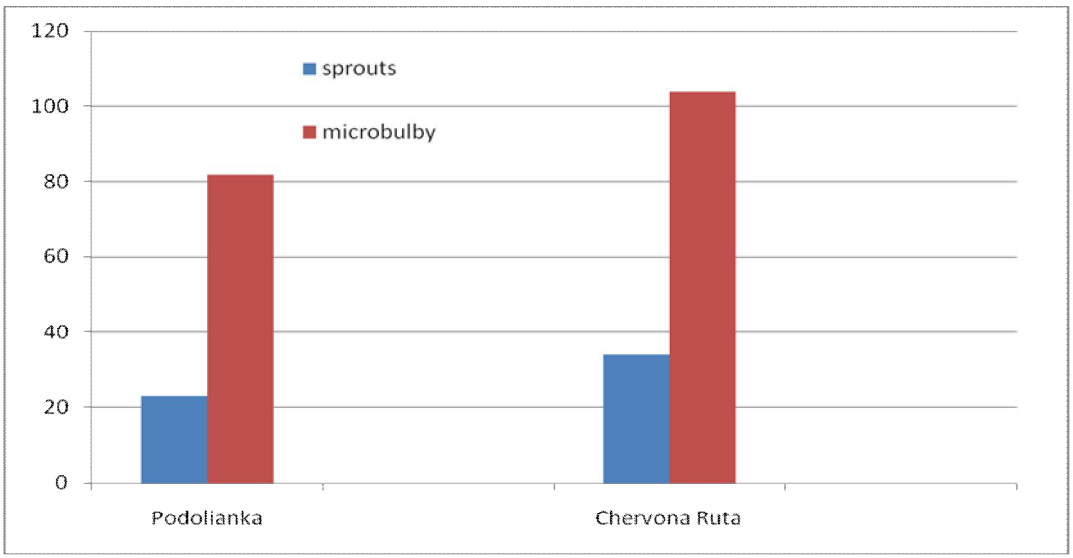

Fig. 1. **Duration of period of cultivation regenerators in dependence on the method of speed-up reproduction,** days

Expenses of time for growing of one plant *in vitro* (sprouts) comparatively with micro tubers were smaller and depending on the studied varieties were: variety Podolianka - 23 days, variety Chervona Ruta - 34 days. Much longer time was needed for micro tubers of variety Podolianka - 82 days, variety Chervona Ruta – 104 days.

At the time of planting seedlings and micro tubers in greenhouses there were found differences in the ontogeny of plants. (Table 1). Seedlings were landed in greenhouses with already formed in certain extent the aboveground part, and micro tubers needed an average of 18 days for the appearance of the first steps. At planted out regenerators defined a different number of main stems of shrubs and different depth of laying of stolons. Plantings which were formed by seedlings were characteristic by single stem and shallow laying stolons (1,5cm).

Table 1 – **Features of ontogenesis of *Solánum tuberósum* in greenhouses, depending on the initial seeding material**

Type of initial seeding material	Quantity, unit		Depth of laying of stolons, cm	Vegetation period, days	Weight of minitubers, g
	shoots	stolons			
Variety of Podolianka					
Seedlings	1,1	2,1	1,5	78	1,68
Microtubers	2,3	4,3	5,7	94	2,74
$LSD_{0,05}$	0,1	0,3	0,2	3	0,08
Variety of Chervona Ruta					
Seedlings	1,3	2,8	2,3	104	1,93
Microtubers	2,9	5,3	6,3	122	3,06
$LSD_{0,05}$	0,1	0,2	0,3	5	0,10

At the same time bushes of potatoes which grown out micro tubers formed two or more stems. Seedlings of both varieties compared to micro tubers had a shorter period of cultivation. In our opinion, it could be due to two factors:

1. Slow down and acceleration of plant growth as a result of difficult post-aseptic rehabilitation plants after culture *in vitro*.
2. Test-tubes plants are started their vegetation period after planting them in greenhouse with already formed stem.

In our opinion, forming of less numbers of stolons of plants from seedlings is also depending on post-aseptic adaptation of plants. Seedlings needs a certain period of ingrowth, during that time turgor is decreasing and it's also significant stressful factor. [9]. It's known that stress inhibits the growth, and hence, it's inhibits the formation of more numbers of vegetative organs and makes vegetation period shorter. In turn, it's impacted on productivity of plants. In both varieties of plants, which were grown in greenhouse from micro tubers, was set more numbers of forming of mini tubers.

Thus, the introduction of the potato *in vitro* at dormancy (formation of micro tubers) improves post-aseptic adaptation.

Another variety of plant, in which studied the effect of the introduction of plants in vitro in the dormancy, were regenerators of two kinds of *Hosta*.

We compared three kinds of seedlings:

1. Regenerators with roots and without entering into dormancy.
2. Regenerators without roots and without entering into dormancy (Fig. 2).
3. Regenerators which were introduced into dormancy (Fig. 3).

Fig. 2. **Morphogenesis *in vitro* seedling *Hosta* depending on cultivation conditions:**
1 – medium with an excess of cytokinin; 2 – medium with an excess of auxin.

Fig. 3. **Introduction of plants of *Hosta in vitro* in dormancy:**
1 – before dormancy; 2 – after dormancy: a) without removal of dead leaves;
в) after the removal of dead leaves.

The research found differences of plants which were cultivated in vitro, as well as differences of plants during of post-aseptic development. Seedlings with root systems, as well as without them differed during the aseptic cultivation.

Thus, when growing plants without roots on artificial nutrient medium with an excess of cytokinin (benzylaminopurine 2,5 mg/l), were formed plants with 2-3 stems and large leaves. However, rhizogenes was almost absent. Only in some plants were formed roots 1-2 with length 50-10 mm. Seedlings that grown on media with an excess of auxin (Indole-3-butyric acid 4 mg / l), by contrast, had extensively developed roots, but inferior to the development of organs of assimilation. Seedling plants *in vitro* which was released from dormancy, were characterized by less developed assimilation system (size of leaf plate) and little root system (3-5 roots with length 2-3mm) but in comparison with other variants there were a greater number of stems.

Morphological features that were detected in aseptic conditions also were manifested at ex vitro conditions (table 2). It means that seedling plants which were formed root systems in vitro also during the planting of culture under cover they had the greatest number of roots: 7,4 pc per plant at the variety of Patriot and 8,1 pc per plant at the variety of Pauls Glory.

Table 2 – **Effect of introducing regenerants *in vitro* in dormancy on post-aseptic ontogenesis of seedlings of *Hosta* at 60th day**

Variant of seedling		Got accustomed, %	Amount of roots, pc	Amounts of stems, pc	Weight of plant, g
Variety of Patriot					
It wasn't in dormancy	Without a roots	43,57	5,3	1,9	0,5
	With a roots	59,4	7,4	1,2	0,9
Passed the dormancy		91,6	6,9	6,1	3,6
$LSD_{0,05}$		4,1	0,3	0,3	0,4
Variety of Pauls Glory					
It wasn't in dormancy	Without a roots	37,8	6,2	1,7	0,6
	With a roots	56,6	8,1	1,4	1,2
Passed the dormancy		87,2	7,6	5,2	3,9
$LSD_{0,05}$		5,3	0,4	0,3	0,5

The highest number of stems had the plants which were emerged from dormancy. Plants of this species with more stems for 60 days of cultivation increased their weight. At the first days of growth they had little and rolled plates of leaves. But over time these plants of both varieties dominated by plants of the other options several times in size and weight. Also plants of variety Patriot which grown from material that hasn't been at dormancy had weight 0,5 grams (without roots), 0,9 grams (with roots) and 3,6 grams (plants which were at dormancy).

The establishing of plants, as well as Morphogenesis of stems and roots, is one of the main indicator of post-aseptic adaptation. There wasn't a clear difference between seedlings and micro tubers of potato at engraftment of aseptic material and there was a clear difference in development, at the same time the indicator of ingrowth of Hosta was very different at variants. In particular, at the variety of Pauls Glory from seedlings without roots established 37,8% plants, establishing of seedlings with roots was higher - 56,6% and the higher establishing of seedling was at plants which were at dormancy - 87,2%. A similar pattern is set to the variety of Patriot.

Conclusions: we revealed, that introduction in dormancy of plants in vitro of *Solánum tuberósum* and *Hosta* improves their post-aseptic cultivation, so, there is a post-aseptic adaptation.

LITERATURE

1. Основи біотехнології рослин: навчальний посібник / В.В. Мацкевич, С.В. Роговський, М.Ю. Власенко, В.М. Черняк. – Біла Церква: БНАУ, 2010. – 156 с.

2. Гиголашвили Т.С. Особенности водообмена ассимиляционной ткани *Solanum* в условиях *in vitro*/ Т.С. Гиголашвили, В.Г. Реуцкий, О.И. Родькин // Физиол. и биохим. культ. раст. – 1997. – Т.29, №6. – С. 461-467.

3. Зеленіна Г.А. Мікроклональне розмноження та фізіологічні особливості *Arnica foliosa Nutt.*/ Г.А. Зеленіна // Вісник Одеського національного університету. – 2004. – Т. 9, Вип. 2. – С. 63-66.

4. Зеленіна Г.А. Морфогенез в культурі *in vitro* сегментів стебла та клональне мікророзмноження *Arnica chamissonis* Less. ssp. *foliosa* (Nutt.) Maguire: автореф. дис. на здобуття наук. ступеня канд. біол. наук: спец. 03.00.20 «Біотехнологія» / Г.А. Зеленіна. – Ялта, 2007. – 22 с.

5. Зеленіна Г.А. Мікророзмноження та особливості водного обміну *Arnica foliosa Nutt.* / Г.А. Зеленіна // Вісник Одеського національного університету. – 2005. – Т. 10, Вип. 5. – С. 7-11.

6. Деревинська Т.І. Проблеми і перспективи вирощування арніки на півдні України з використанням мікроклонального розмноження / Т.І. Деревинська, Г.А. Зеленіна, Н.С. Любимова // Збірн. наук. праць „Фальцфейнівські читання". – Херсон: Терра, 2005. – Т. 1. – С. 117–118.

7. Куперман Ф.М. Морфофизиология растений. Морфофизиологический анализ этапов органогенеза различных жизненных форм покрытосеменных растений / Ф.М. Куперман. – М.: Изд-во «Высш. школа», 1973. – 256 с.

8. Мацкевич В.В. Удосконалені методи оздоровлення картоплі від вірусів та використання отриманого матеріалу в первинному насінництві: дис. кандидата с.-г. наук: 06.01.14 / Мацкевич В'ячеслав Вікторович. – Київ, 2004. – 153 с.

9. Современная ботаника в 2 томах. Т 2. Глава 21. Регуляция роста и развития: гормоны растений. Глава 25. Внешние факторы и рост растений / Пер. с англ. – М.: Изд-во „Мир", 1990. – 344 с.

Введение регенерантов in vitro в состояние покоя как путь постасептической адаптации

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При использовании культуры тканей в размножении растений очень важная и значимая проблема – их постасептическая адаптация, поскольку при посадке неадаптированного материала потери могут составлять до 100 %. В то же время, в природе известен способ приспособления растений для предотвращения неблагоприятных факторов как вхождение растений в состояние покоя. Изучая эффективность введения регенерантов *in vitro* в состояние покоя

двух филогенетически отдаленных видов (*Solanum tuberosum* и *Hosta*), установлена эффективность этого приема. Растения картофеля сортов Подолянка и Червона рута, прошедшие состояние покоя, имели длительный вегетационный период и обеспечивали высокую урожайность. У регенерантов хосты сорта Паульс Глори из рассады без корня прижилось 37,8 % растений, приживаемость рассады с корнем составляла 56,6 % и наибольший процент приживаемости (87,2 %) составлял в варианте с растениями, которые прошли состояние покоя. Подобная закономерность установлена и по сорту Патриот.

Таким образом, на растениях картофеля и хосты установлено положительное влияние введения регенерантов *in vitro* в состояние покоя на постасептическую адаптацию.

Ключевые слова: культура тканей, рассада, адаптация, *Solanum tuberosum*, *Hosta*.

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SUMMARIES

The fertilization selectivity as a possible cause of a biological contaminations in the triticale seed-growing sowing

V. Rubets, O. Mitroshina, V. Pylnev

The biological contaminations be a consequence of the spontaneous inter variety hybridization. The biological contaminations can to reduce the varietal purity of the seed-growing sowing triticale. The spontaneous hybridization is determined by the flowering biology in triticale. Triticale genotype includes in the genome of the autogamic crop – wheat and the genome of the xenogamy crop – rye. To consider that the rye genome influences to increase ability of a triticale to spontaneous hybrids in the seed-growing sowing can be determined by fertilization selectivity.

The results of the study of fertilization selectivity in winter hexaploid triticale varieties are presented in this investigation. Fertilization selectivity in progamic stage was determined as a percent germinated pollen grains on the pistil stigmas and as a pollen tubes length. It is supposed if fertilization selectivity is presented in the investigated triticale variety; the preferable pollen will be germinated better on its pistil stigmas. And pollen tubes length will be longer in that case. In the event of the fertilization selectivity absence in a triticale variety the germinated pollen grain percent on the pistil stigmas will be approximately similar when it pollination were realized by the own pollen or by another triticale variety pollen. And pollen tubes length will be approximately similar as well.

There are winter hexaploid triticale varieties with white spikes (recessive sign) were used as a investigated model objects (Germes, Valentin, line 21759|97). Its flowers were emasculated and isolated before blossoming. Then part of them were pollinated by own pollen (self-pollination) and other part of emasculated flowers were pollinated by the pollen of another triticale varieties with red spike (dominant sign). These varieties are Vodoley and Presto. The fixation pollinated flowers were realized in a different time after pollination (after 20, 45, 60, 90 and 120 min). Fixer were consist three parts of 96% ethyl spirit and one part of acetic acid. Then the histological squash stained preparations of the pistil stigmas were prepared. The light microscope was used for observation germinated pollen numbers on the pistil stigmas, and luminescent microscope – for pollen tubes length measurement.

There were found that investigated triticale varieties are differed in its ability of the fertilization selectivity in a progamic stage. The presence of an own pollen preference were observed in the variety Germes. Pistil stigmas of the line 21759|97 preferred pollen of another triticale variety. And variety Valentin did not have preference anithing pollen.

The fertilization selectivity in the postgamic stage of fertilization were studied by the correlation of the hybrid (red-spike) and unhybrid (white spike) plants, which were received from pollination of emasculated flowers of the investigated triticale varieties by pollen mixture. Pollen mixture included 50% own pollen of the variety with white spike and 50% another red-spike triticale variety pollen. It is showing that variety Germes and line 21759|97 have fertilization selectivity. The first variety preferred own pollen (a number white-spike plants where major more than the hybrid red-spike plants). Number plants with white and red spike color in the variety Valentin were approximately similar.

Like this, our results are convincing confirmation of a presence the fertilization selectivity in the investigated triticale varieties.

Varietal differences in winter hexaploid triticale necessary use in organization the seed-production work.

Key words: triticale, seed production, fertilization selectivity.

Modern philosophical comprehension of the system of agriculture as a scientific category

I. Primak, M. Voytovik, E. Primak

System - this relatively isolated and ordered set of interacting purposefully and appropriate elements of the inherent connectivity and the ability to implement specified objective functions.

This definition is sufficiently characterized such systems (eg, physical objects) when the system and environment are clearly delineated, and structural elements of the system easily distinguishable.

A deeper disclosure of the contents of the system as a scientific category associated with a new philosophical understanding of this concept, the concept of distribution system for the study of abstract logical, conceptual, symbolic and other systems. Therefore, a second, higher level of abstraction system is defined as a fundamental category of scientific and methodological knowledge.

Definition of the system includes the following four parts: the subject (the researcher) ↔ the object of study - the objective of the study ↔ language study. In the above approach, the concept of "system" becomes philosophical nature. Therefore, the system can be defined as an ideological philosophical category as a way of thinking.

The scientific definition of farming systems should fit into the general definition of "system" of the specification in their subject area, that reflect the main features of the system: integrity, availability-wide objectives and performance criteria, the ordering of the subsystems and their purposeful interaction to achieve system-wide goals.

The system of agriculture is an integrated set of interrelated and interacting purposefully agrobiological, technical and technological, organizational and economic measures taken for the effective use of land resources to produce the required volume and quality of crop production for the reproduction of soil fertility and conservation.

Developing adaptive farming systems directly linked to the critical state economic problem - the rational distribution of agricultural production zones in the country and the relevant zoning of production. In practice, this area is through the development of zonal farming systems.

The system of agricultural production in the country and the system of agriculture should be generalized expression of complex scientific and organizational support for the agricultural sector of the state, integrating achieve biological science, technology and modern technologies, new forms of organization of production and the state agrarian policy under the new market economic relations.

With the development of modern adaptive farming systems within the agriculture should be considered as a minimum, the following basic requirements: mobility, multivariate decisions with regard to the conditions of demand (changing), supply and price situation on the market, adaptability to specific landscape and zonal agro-climatic conditions, in terms with optimal utilization of resources rational restrictions on economic, social and environmental requirements, environmental friendliness, providing an optimum combination of crop and livestock sectors.

By design concepts to create a generalized adaptive-landscape farming systems must use the methodology of modern systematic approach and a wide range of mathematical methods of formalizing scientific knowledge, above all, the mathematical modeling of behavior control economic and biological systems.

A comprehensive assessment system as a scientific category, the analysis of system properties, the nature of interaction between system and environment, specific patterns of motion and principles of management - all of which makes it possible to formulate a generalized understanding of the systems approach as an integrated scientific methodology.

In modern science, a systematic approach is seen as a methodology for the study of complex phenomena, objects, processes, through their representation in the form of integrated systems for the detection of systemic properties, internal structure and their regulatory mechanisms.

Systems analysis - a set of specific research methods and interventions of the principles of systems approach. The purpose of systems analysis - the right to formulate and structure the problem itself, to turn a difficult task into a series of simpler problems, solution methods are known.

Systems analysis is used effectively in such situations: the solution of new problems when developing entirely new system and solving problems that are unique, and when the problem has

branched connections and long-term consequences, and if the problem is associated with risk factors and uncertainties; for coordination purposes with many of their achievements, for solving the optimization problem using the methods of mathematical modeling.

Key words: system, system of agriculture, scientific category, philosophical comprehension, signs, fertility, land resources.

Sowing date influence on yield of onion

O. Knyazyuk, L. Orlyuk

The average plant height Oporto varieties of onion (56.3 cm) was the highest at early spring sowing (20.03), and the average bulb weight (71.4 grams) – was the highest before winter sowing. The average height of plant varieties of Skvyrska (57.2 cm) was the highest for sowing 05.04, and average bulb weight (66.4 g) in early spring.

Biometric varieties of different ripening time of onions indicate before winter sowing time preference, which contributes to the formation of a larger number of leaves, their length, and aboveground parts of bulbous plants. This pattern is particularly evident for Early variety and Middle class and middle-to-best characteristics of growth and development manifested in early spring sowing.

The highest yields of early varieties of Chernyakivska variety (44kg/10m2) marked before winter sowing, which is 23 kg more than in late spring (20.04). The same pattern exists in middle-class bow Oporto. The highest yield of middle-class Skvyrska (36 kg/10m2) was observed under early spring sowing, which is 2 kg more than under winter and 9 kg more than in late spring sowing.

Harvested onions should be maintained properly to be used for consumption. Generally, losses from diseases in vegetable crops is inevitable, but they should be minimized. Tolerant varieties and hybrids of onion to pathogens have been bred., Fungicides inhibiting the activity of parasitic pathogens through preventive spraying are applying and during the growing season plants mass destruction. But bulbs may be affected by diseases such as bacterial rot, gray cervical rot, Fusarium and black mold while stored. In addition, significant weight loss in sprouted bulbs and vegetables is observed.

Studying the influence of sowing time on the quality of Chernyakivska early ripening variety shows that the maximum weight loss in bulbs (17%) seen are observed under late spring sowing (20.04). Also, losses in sprouted bulbs during storage, were higher (9.6%) under late spring sowing.

Thus, before winter way of sowing onion stands out due to its use promotes resistance against pathogens of bulbs, especially against cervical gray rot. Number of bulbs affected with bacterial rot and black mold in mid- spring (5.04) and late spring (20.01) seeding method was approximately the same. Defeat bulbs Fusarium did not depend significantly on the sowing time.

In general, the before winter sowing preserved almost all bulbs (95%) , and in late spring it made only 70%, or the loss amounted to 30%, from which we can conclude much better keeping quality bulbs under before winter sowing .

Top biometric indicators of Early and middle-class onion (linear growth of plants, the average weight of bulbs) are marked with before winter sowing (01.11), and the middle-in-early spring (20.03).

The highest yields of early ripening varieties of Chernyakivska onion varieties (44 kg/10m2) and Oparto middle-class (40 kg/10m2) marked with before winter sowing, which made respectively, 23 and 17 kg more than in late spring sowing. Middle Class Skvyrska onions ensure maximum yield in early spring sowing (20.03).

Onion optimum sowing time as process technology of its cultivation, increases the yield of early ripening varieties by 30-50% and Medium by 10-30%.

The largest losses in storage and diseases affect of onion were observed in late spring sowing (20.04), and resistant to the factors were the onions sown before winter.

Further scientific research is focused on the research of different ripening varieties of onions and turnip productivity depending on the layout of the area and supply.

Biometric indexes of different ripening varieties of onions indicate preference of before winter sowing time, which contributes to the formation of a larger number of leaves, their length, and aboveground parts of bulbous plants. This pattern is particularly evident for Early and Middle-class onion and middle- to - best characteristics of growth and development manifested in early spring sowing.

Key words: onion, varieties of different string maturation, growth and development of plants, biometrics, performance, storability.

Characterization of the newly established breeding material of winter wheat with increased resistance to pathogens

A. Zvyagin

Material and methods of studies. The research was conducted during 2007-2012 years in the laboratory of breeding and physiology of winter wheat V. Ya. Yuriev NAAS in the direction of creating the initial material of winter soft wheat with high yield and grain quality, high winter frost and Smut diseases resistant.

Experiments were carried out in the field of nurseries Research Institute Rotation. Breeding patterns at an early stage in the selection process were seeded hybrid nursery F2, hand , further breeding nursery with the accounting area of 1m2 plots in the control nursery F3, previous and competitive strain testing where accounting land area was 10m2 .

Phenological observations were carried out in accordance with the methods of state testing crops [4].

Creating backgrounds infectious pathogens and evaluation of resistance against fungal diseases of winter wheat was carried out at all levels of the selection process for the guidelines [5,6]. The reliability of the statistical parameters and the level of potential yield estimated by Dospehovym BO [7].

In winter, frost studied by artificial freezing in the freezer CST - 1 Sector of Plant Physiology and by counting the number of plants in the fall and in the spring when vegetation .

Weather conditions largely determine the efficiency of infectious create backgrounds in research on plant immunity. It was extremely difficult to plant winter wheat under conditions when the winter was in 2009-2010, extreme temperatures of + 2-1 ° C heat up - 18-20 ° C below zero led to a weakening of the plants. The content of soluble carbohydrates in tillering nodes decreased to 26%. In late January 2010, due to rain and snow thaws short formed ice cover to 8.10 cm, resulting in injury and partial loss of plants in experimental crops. Autumn-winter 2010-2012 biennium, were satisfactory for wintering. Weather conditions during spring and summer months, years 2009-2012 , were dry. Under these conditions, there was limited development of leaf diseases of cereals crops.

Natural conditions are not sufficient to differentiate the signs of stability as important factor phyto sanitary condition of breeding crop rotation is to create a background of infectious pathogens. Display of data factors influenced the effectiveness of recruiting genotypes in primary care in the selection and formation characteristics of adaptability in future among the constant lines.

Results and discussion. The investigations were aimed at identifying and attracting sources of resistance to pathogens examples of world collection of scientific institutions in the country and adapted to local conditions recognized varieties to create original material by intraspecific hybridization followed by selection of genotypes resistant to infectious backgrounds, their effective use in breeding for combination one genotype economically valuable traits and resistance to adverse environmental factors.

Intraspecific hybridization followed by individual selection in hybrid seed at this time are the main methods in breeding of winter wheat for increased resistance to disease. Therefore, in order to create new promising starting material for breeding high-yielding varieties of winter wheat with excellent grain quality, high winter hardiness and disease resistant, have been involved in crosses sources of resistance to leaf diseases and smut (L 71-04 KH, Helios, PN 04 - 12 Fortunately, Brutus, Olma, Swallow Odessa , Spasivka , Princess Olga , Dromos, Meritto, Cornet and others) and

recognized varieties adapted to local conditions (Harus , Vasilisa , Kharkov 105, Doridna , perfect , gorgeous, Alliance, Darkie and other). Couples were selected for breeding so that the parent components differed by resistance groups against pathogens (Erysiphe graminis, Pussinia triticina Erikss, Tilletia tritici, Septoria tritici, Fusarium nivale) and had a breeding value for further work. Parental forms observed complex agronomic traits have been combined in the new genotypes.

As a result of targeted selections were highlighted selection and valuable line of high-level resistance to leaf diseases, smut, productivity, grain quality and hardiness that in terms appropriate to national standards (Podolyanka) and exceeded it.

During the research the results of selections from 1480 studied hybrid populations F2 - F6, 19 were allocated selection of lines that differed combined resistance to pathogens and adverse abiotic environmental factors, including 14 high winter-hardy lines (8-9 points), with a combined resistance (7-8 points) to powdery mildew, septoriozu, brown leaf rust and 5 lines resistant to smut and rust (7-9 points).

Key words: winter wheat, infectious background, stability, power, hybrids, lines, disease, crop.

Forming the main ear length in winter wheat lines of different ecological and geographical origin

L. Burdenyuk-Tarasevych, **M. Losinskiy**

The paper deals with the specific features of main ear length in winter wheat lines of different ecological and geographical origin comparison of the research years hydrotertmal indexes. There has been shown the impact of main ear length on forming ears number, grains number and weight and ear density. The correlation between these indexes are discussed in the paper.

Ear structure - dependent on ear core length, number and distribution of ears, ear and flower husk size - is of great importance in photosynthetic active surface of a soft winter wheat crop.

Thus the research aimed at comparative estimation of soft winter wheat lines of different ecological and geographical origin and defining the norm of their reaction to growing condition change. It also aimed at determining correlation between main ear length and ears number, grains number and weight and ear density.

The research was conducted at Bila Tserkva research selection station of Institute of bioenergetical crops and sugar beets in 2011-2012. 11 lines of soft winter wheat of the station testing (ST) obtained by crossing sort of different ecological and geographical origin were researched. We have obtained the following lines by crossing steppe and forest-steppe ecotypes: Donetska 48 x Veselka (7ST), Donetska 48 x Bilotserkivska intensive (8ST), Povaha x Forest steppe pearl (42 ST), Luhanchanka x Bilotserkivska 71/03 (29 ST), Rostavytsa x Driada 1 (26 ST), Bilotserkivska 47 squarehead x Odes'ka 162 (24 ST); crossing forest-steppe ecotype with foreststeppe: Elegia x Forest steppe pearl (12 ST), Kyivska 8 x Rastavytsya (44 ST), Veselka x Myronivska 65 (54 ST); crossing Donetska bald ecotype sort with Century sort (USA) (22 ST); foreststeppe ecotype sort Semidwarf 3 with Century sort (USA) (17 ST). The lines of different origin were compared to each other and to the national standards of Bilotserkivska Semidwarf (Bila Tserkva research selection station), Forest steppe pearl (Bila Tserkva research selection station), Podolyanka (Myronivka Institute of wheat). The tests were conducted in accordance with the National Sorts Testing techniques. Pea was the predecessor. The machines were conventional for the Foreststeppe zone.

It has been found out that the correlation between main ear length and ears number ranges from weak to significant depending on the crossing combination. Most researched genotypes show medium correlation.

In two years on the average reliably higher main ear length than in the sort standard Podolyanka was observed in 42 ST, 24 ST lines (steppe ecotype x forest-steppe ecotype), 44 ST, 54 ST (forest-steppe ecotype x forest-steppe ecotype), and 22 ST (forest-steppe ecotype x Century).

The analysis of correlation of main ear length with ears number, grains number and weight proves the positive character of the relation and dependence on the lines origin.

By the research results we have distinguished the 44 ST line obtained by involving into the hybridization Kyivska 8 and Rostavytsa forest-steppe ecotype which showed a stable strong correlation between main ear length with ears number, grains number and weight.

Key words: winter wheat, crossing combinations, lines, ecotype, main ear length, ears number, grains number, grains weight, ear density, correlation coefficient.

Biological circuit of nutrients in a short crop rotation

V. Kupchyk, I. Prymak, T. Kolesnyk

In general, the biological cycle of the circuit can be represented as a dynamic system which consists of four parts: the circuit capacity, removing the nourishing elements with the basic yield and the by-products, returning nutrients to the soil with plant and root remnants, stock of mobile forms of nutrients in the plow soil layer.

Estimation of biological circuit units parameters are based on the results of agrochemical analysis of nitrogen, phosphorus and potassium in crops individual structural components and crop rotation biomass.

The crop rotation study indicates that total capacity under red clover growing without fertilizers was 89.8 kg / ha. Applying fertilizer increases the circuit capacity by 38-154% with the maximum rate of 228 kg/ha under triple norm of fertilizers treatment. Accumulation of nitrogen in the productive part of the harvest exceeds its returning to the soil with plant remains in the control and in the variants with minimal fertilizing. Nitrogen return factor is 0,46-0,47 . On the background of binary and ternary fertilizer rate the nitrogen accumulated in plant debris exceeds the production commodity output and nitrogen return ratio increases to 0,51-0,52 .

Growing winter wheat without the fertilizers use causes reduced capacity of nitrogen circuit by 1,3 times in comparison with clover and nitrogen return to the soil is reduced by 8.3 times. Applying mineral fertilizers increases the capacity of the nitrogen circuit up to 105-181 kg/ha , but its rate of return is very low (0,08-0,09) regardless of fertilization rate.

Nitrogen circulation capacity in sugar beet crops without fertilizers is 77.3 kg / ha. 53.6 kg / ha (69%) of soil nitrogen reserves is removed from the soil with harvest roots, and its return to the soil with plant remains makes 23.7 kg/ha (31%). Sugar beet organic mineral fertilizing system enhances both the removal of nitrogen from crop roots and its returning o the soil with plant remains, but the rate of return is low and makes 0,31-0,32 .

Nitrogen circulation capacity in peas crops is the highest among the rotation crops, making 94 kg / ha under zero fertilizing rate. Applying fertilizer increases the absorption capacity by 35-93 kg/ha, but the nitrogen alienation with the production yield crop increases to 83-87 %. Nitrogen return factor is 0,14-0,16 .

Barley crops are characterized with minimum nitrogen circulation capacity in both the control and mineral fertilizers treatment (51,9-116 kg / ha), but with the maximum amount of nitrogen alienation from production yield (88-94 %). Nitrogen return with the crop remains factor is ,08-0,1.

The amount of phosphorus inclusion into the biological circuit is much lower than that of nitrogen due to the low concentration of the element in crops. Phosphorus content in the crop rotation biomass without fertilizer ranged from 20.2 kg / ha in crops of red clover and 26 kg / ha of sugar beet. Application of fertilizers enhances the capacity of circulation of phosphorus by 2,4-3,3 times. Cereals and legumes remove 88 %-95 % of the basic yield and by-product from the soil, red clover - 59-63 %, sugar beet - 36-58 % of the phosphorus involved in the biological cycle of the circuit .

Applying fertilizers increases the accumulation of phosphorus in crops and root debris by 4-22 %. Phosphorus return factor for grains is 0,06-0,12, for peas - 0,12-0,16 ; for sugar beet - 0,36-0,41 , for red clover - 0,37-0,40.

The volume of potassium circuit circulation of occupies a middle position between the nitrogen and phosphorus one. Growing crops without fertilizers provides the circuit capacity of 19.4 - 38.2 kg / ha, peas - 41.1 kg / ha, red clover - 68.3 kg /ha, sugar beet - 96.5 kg / ha.

Under systemic fertilizers applying 2,3-3,2 times more potassium is involved in the circuit. Most potassium is accumulates in the biomass under triple fertilizer level rate: red clover - 217 kg / ha, sugar beet - 271 kg / ha winter wheat - 96.5 kg / ha, peas - 88.6 kg / ha , barley - 66 8 kg / ha. The largest amount of potassium is extracted from the soil with the basic crop yield and the by-products in under winter wheat and barley 84 and 90 % respectively, peas - 71%, sugar beet - 63 % red clover - 55% in non-fertilized variants. Under fertilizing the amount of detached potassium is reduced by 3-5%. Potassium return with crops remains ratio for cereals is 0,16-0,20; peas - 0,25-0,29 ; beet sugar - 0,32-0,37, red clover - 0,44-0,49 .

Features of crop rotation plants nutrition, of nutrients biogenic migration in the soil-crop system necessitate generalizing the nutrients circulation parameters for the entire rotation.

The natural rate of soil fertility without using fertilizers provides nitrogen capacity circuit of 76.2 kg / ha phosphorus - 22.7 kg / ha and potassium 52.8 kg/ha. A minimum level of fertilizers use of 4 t / ha manure + N16 P25 K25 increases the capacity of nitrogen circulation to 113 kg / ha, that one of phosphorus – to 35.2 kg / ha, of potassium – to 82 kg / ha. Maximum accumulation of nutrients in biomass is provided under triple level rate of fertilizers - 12 t / ha manure + N48 P75 K75: nitrogen - 188 kg / ha, phosphorus - 63.8 kg / ha, and potassium - 148 kg / ha. Nitrogen production removal from a hectare of crop rotation area is 74-76 %, phosphorus - 76-78 %, potassium - 65-67 %. Crops remains return rate for nitrogen is 0,24-0,26; phosphorus - 0,22-0,24; potassium - 0,33-0,35. It allows to predict the possibility of nitrogen and potassium soil store mobilizing both under the minimum and maximum of fertilizers use level in crop rotation.

The defined parameters of the nutrients biological circuit are the basis for the calculation of static and dynamic balance of nutrients in the crop rotation and of fertilizing optimization systems.

Key words: crop rotation, fertilizer, nutrition elements, biological circuit.

Influence of mineral fertilizers on nutrient regime of Southern Chernozem in growing

T. Kachanova

One of the basic factors of agricultural production intensification is using of mineral fertilizers, on the stake of that is no less as 30-50 % additional increase of harvest. Efficiency of mineral fertilizers is closely dependent on the soil-climatic conditions of a region, complex of growing technology and culture biology. Oat is called enough on improvement of soil nutrient regime, due to its well developed root system and to its high absorptive ability that is a substantial reserve of its grain productivity increase. However, in of Southern Steppe of Ukraine conditions this isue is not studied properly, since that crop is not widely grown. The purpose of our research is to define the influence of mineral fertilizers on soil nutrient regime in oat growing.

The research was conducted during 2006-2008 in farmstead «Ukraine» Ochakiv district of Mykolaiv oblast. The object of research were sorts of Chernihivsky 27 oat and Skakun oat. Soil of an experimental plot is chernozem southern weakly eroded clay loamy on loess's, content of humus (for Turin) is a 2,4 %, acidity – close to neutral (pH off 6,8).

The sowing plot area is 240 м^2, record – 25 м^2, repeated triple. The experiment agrotechnics was generally accepted for Southern Steppe of Ukraine. A predecessor was sugar beet. The following types of fertilizers were applied ammonium nitrate (N 34 %) and superphosphate simple (P 20 %) with folding method under the preseed cultivating accordingly to experiment plan. The selection of the soil standards was carried out according to the generally accepted methodologies. Soil nutritive elements content was determined in a layer by a 0-30 cm during sowing and before harvesting of oat. Nitrate and ammoniacal nitrogen was determined for Kravkov, movable phosphorus and exchange potassium – for Chirikov.

The research has shown that of unfertilized variant of soil the content of nutritive elements in oat seedling stage for modern classification was average on nitrogen and potassium and there was an

increase on phosphorus. Applying mineral fertilizers influenced the content of nitrogen connections in soil significantly. Applying nitric fertilizers in a dose of N_{60} (on a background P_{40}) increased the total amount of mineral nitrogen ($N\text{-}NH_4 + N\text{-}NO_3$) by 26,9 % compared to unfertilized background. Nitric fertilizers in a dose of N_{90} (on a background P_{60}) provided the most significant increase of total mineral nitrogen amount by 55,7 % compared with control.

Movable forms of phosphorus is one of important signs of soil fertility. In our research phosphorus was added in doses of P_{40} and P_{60} in different combinations with nitric fertilizers. It provided substantial increase of movable phosphates, but in lower percentage ratios compared with nitric fertilizers. The dose of P_{40} provided movable phosphorus content in relation to the control 5,1 % on average, and dose P_{60} – on 11,9 %. Our research has shown, that fertilizing of oat did not influence the content of accessible potassium in soil, that ranged within limits of a 26,2-26,7 milligram per kilogram of soil (mgs/kg) content without fertilizers 25 mgs/ kg.

During vegetation of oat accessible nutritive elements content in soil diminished due to their use by plants for forming harvest, microbiological activity, redistribution in soil layers and other processes.

At the end of vegetation the amount of nitrogen diminished by 1,64-2,06 mgs/kg depending on the variant of fertilizer. Most nitrogen was used by plants in the unfertilized variant (81,6 %), the least – on a background greatest in experimental dose of nitrogen $N_{90}P_{60}$ – 65,8 %.

Estimation of soil nutritive mode state on the amount of accessible nitrogen at the end of oat vegetation allows establishing the following changes: soil of unfertilized variant belongs to a group with very subzero content of nitrogen, fertilized – to the group with middle content of this element.

For completion of oat vegetation amount of movable phosphates in soil also diminished in all variants of experiment, but a phosphatization positively influenced on their content by comparison to control. There were less charges of movable phosphorus (7,6-9,2 %) on fertilized variants, than on unfertilized background (11,03 %). Charges of potassium for a vegetation were least and presented 1,0-1,7 mgs/kg to soil or 4,0-6,8 % depending on background of fertilizer.

Average three years greatest harvest on both sorts was got at bringing of most dose of fertilizers $N_{90}P_{60}$ – 3,45 т/ha, that on 16 % anymore than harvest on a control variant.

Thus, during oat vegetation most intensively from soil mineral nitrogen (65,8-81,6 %) is lost, and charges of phosphorus and potassium present according to 7,6-9,2 and 4,0-6,8 %. Maximal in experiment dose of mineral fertilizers ($N_{90}P_{60}$) allows more productively spending nutritive elements from soil, foremost, mineral nitrogen.

Thereby, on vegetation of plants used nutritive elements from soil, most nitrogen and phosphorus they consumed on the variant «without fertilizers» (accordingly 82 and 11 %), least – on a phone $N_{90}P_{60}$ (accordingly 66 and 8-9 %). An expense of potassium for vegetation was the least, and 4-7 % made depending on the fertilizer phone.

The greatest content of mineral nitrogen and movable phosphorus in soil was at use dose of $N_{90}P_{60}$, this dose provided the most increase of harvest of oat grain.

Key words: oat, fertilizers, content of nitrogen, content of phosphorus, content of potassium, soil.

UGmax use in order to crop yields effectively increasing and soil fertility improving

D. Adamenko, V. Polischuk, I. Kravets, A. Yatsenko

Crops cultivation technology improvement is one of the most important modern crop production problems with minimum material and labor resources cost. This will increase crop productivity main numbers, increase its growing profitability and ensure plant resistance to adverse environmental factors.

Correct nutrient management - one of the main high yielding and high-quality agricultural products growing components. Nutrient elements need to make in the right proportion, balance, on time and in that place, where the culture may need to use them. For maximum efficiency it is necessary to minimize all losses and these substances consumption optimize in certain culture.

In economic and energy crisis conditions, where animal industry is in a deep recession, for agricultural products sustainable production becomes important secondary products (chopped straw, corn stalks, sunflowers, etc.) efficient use, crop sowings (green manure) implementation that approximates rotation functioning to natural ecosystems and saves costs of industrial fertilizers significantly.

In order to these issues solving «Bogdan» (Poland) firm fundamentally new fertilizer - UGmax developed, which represents a liquid concentrate and has in its composition microorganisms, balanced macro-and micronutrients that promote more intensive decomposition straw and other crop residues processes passage. In addition, this fertilizers use contributes humus reproduction - the main factor that determines the cultures yield. With preparation systematic use provides soil structure improved, drought consequences softens, cereals plant tillng improves, affects on sugar formation in sugar plants significantly, exclusively can be used as a nutrient for both fruit and decorative plants and pots.

Research on preparation effectiveness use determining on soil structure improving and crops indexes productivity increase was performed in the Institute of Root Crops NAAS of Ukraine (Uman, Cherkasy region) in 2009-2011. This preparation contributed at 0.9 l/ha dose with the following plowing under winter wheat, sugar beet and corn in autumn.

To add humus in the soil and increase crop productivity UGmax can be used for any soil before basic soil tillage and irrigation as a nutrient each year.

Preparation UGmax influence research on sugar beet productivity revealed that preparation in making before soil cultivation (variant 1) and using it as fertilizer (variant 2) yield increase, respectively. This preparation use only as irrigation that provided yield increase compared to the control (option 3).

Preparation making before soil cultivation under corn (variant 1) observed yield increase. This preparation UGmax using as a fertilizer (variant 2) and gave the highest yield increase – 4.4 kg/ha.

UGmax using only as irrigation (variant 3) is observed increase yield at 1.5 kg/ha compared to control. At preparation UGmax influence research on winter wheat productivity was revealed that preparation making in before soil cultivation (variant 1) yield increased to 2.7 kg/ha. UGmax using as a fertilizer (variant 2) gave the highest yield increase - 4.2 kg/ha.

It is established that the preparation introduction helped to preserve the level of humus in the range of 3.2 -3.4 % by indicators productivity analysis. Yield increase of thus was: for beet sugar - 0.6 - 0.8 t/ha, for corn - 0.42-0.44 t/ha, for wheat - 0.40-0.42 t/hectares.

This preparation use is effective in sugar beet, winter wheat and corn root feeding. The optimal dose of the preparation is 0.9 l/ha in making before primary tillage and 0.6 l/ha for feeding during the growing season. Higher doses help to productivity indexes increase, but these indexes do not differ from the figures in the proposed norms.

Therefore it is determined that the preparation contains all necessary balanced macro-and micronutrients for plants, creates an optimum (neutral) pH of the aqueous solution and contributes to the preservation humus level.

This preparation use is effective when on crop remnants contributed with the following plowing for all crops grown that are cultivated in Ukraine.

Key words: soil fertility, fertilizer, micronutrients, concentrate, humus.

The influence of environmental factors on the implementation of new varieties of soft winter wheat breeding potential

V. Hahula, L. Ulych, O. Ulych

There are two ways to improve winter wheat productivity. Breeding and genetic improvement of varieties, development of new genotypes appropriate level of yield and grain quality of food hold a prominent a prominent place belongs to among them. Therefore, it is important to take a scientific basis for development of environmentally adaptive principles for selection and placement of certain varieties in agro-climatic conditions, and studying the nature

of interaction of geno0type and the environment effects of environmental factors on the formation agrocenoses performance is an important and topical area of genetic selection and agrobiological research.

The study was conducted during 2010-2012 in the of research crop rotations fields of crops national examination examination in different agro-climatic zones according to f the national examination methods and grains, cereals and legumes crops testing. It has been found out the new registered varieties of winter wheat under different soil -climatic zones, environmental and varying weather conditions and stress realize their yields potential differently. The magnitude and stability of yield in years, the efficiency of a particular class are largely dependent on the environmental factors and successful placement of certain varieties in certain soil-climatic zones, subzones, microrozones or geographical locations. It is especially noticeable in unfavorable years, stressful situations or inadequate resource provision of the agrotechnological process, significant errors, implifications or errors in the methods of farming. It sometimes results in the varieties undergoing inadequate conditions that do not correspond their biological properties which causes decline in their performance.

Therefore winter wheat varieties with a wide homeostasis on their response to meteorological and agroecological factors, optimal genetic information program comprising to the greatest number of useful features and characteristics should be chosen for each ecological region. The basic requirement on varieties placing in ecological regions should be the variety properties corresponding the natural ecological, agronomic and economic environment it is grown in and its adaptive capacity.

Newly registered winter soft wheat varieties exhibit a profound response to specific agroecological conditions in their cultivation areas. To unleash the potential of their performance successfully one should implement a differentiated approach to their placement in the agro-climatic zones, subzones, microzones and geographical locations in compliance with the selection and biological properties of varieties of natural environmental conditions, agronomic and economic environment in which they grow and the natural adaptive capacity. Varieties with optimal genetic information program which is comprising the greatest number of useful features and properties should be adopted for each ecological region.

Due to a set of performance indicators and ecological plasticity Sotnytsya, Calancha , Hurt, Tonatsiya Dobrochyn should be placed in the steppe zone; - Sotnytsya , Oriyka, Odesla Lira, Tatsitus and Fidelius should be placed in the forest steppe zone; Krayevyd, Tatsitus , Fidelius, Sailor, Ethel - in Polissya. Sotnytsya and Oriyka varieties are characterized with sufficiently high yield under different growing conditions, show the ability of the genotype to realize their potential and are resistant to specific environmental conditions in different years. In some subzones, microzones and geographic regions other varieties display better traits.

Keywords: variety, ecological factor, soil climatic zone, subzone, microzone, yield, adaptation, productivity potential.

Winter wheat productivity depending on the crops sowing term and application of growth regulators in Western Forest Steppe

M. Prysyazhnyuk

Despite the fact that there are a lot of varieties with potential yield of 8-15 t / ha in Ukraine in recent years, the average productivity in the country does not exceed 2,8-3,5 t / ha. The level of best varieties potential yield of winter wheat has not yet been fully implemented. Therefore , the main task of Ukrainian farmers is to increase the yield and to ensure stability in winter wheat grain production as soon as possible.

To increase the yield of winter wheat with a simultaneous decrease in the level of technogenic and anthropogenic impact on the environment and to improve the efficiency of grain production under changing climate and energy saving, one need to find ways to improve varietal technology and the tactics to use it.

Sowing term is the most efficient element of the technology that does not require any additional material costs, but affects the realization of the wheat potential productivity significantly.

Analysis of the influence of sowing terms with applying " Vermybiomag " and " Vermyyodis "growth regulators for presowing seed treatment of Zolotokolosa winter wheat varietiy on the yield showed that the highest yield of winter wheat was in the variants where sowing was carried out in an optimal (second term).

The results of three years of research have shown that growth regulators under single and double spraying Zolotokolosa winter wheat varieties on all the variants under different sowing terms provided, compared with the control, 0,48-1,64 t / ha increase in the crop productivity. The results of the economic evaluation showed that applying crops growth regulators " Vermybiomag " and " Vermyyodis" in growing Zolotokolosa winter wheat variety, under different dates of sowing, in all variants, compared with the control, provided 23,3-43,7 % increase in profitability and production cost reduce by 50,2-63,7 UAH / t.

The largest relatively net income of 9630 hrn./ha (for the cost of wheat in 2012.) and profitability of 250.1 % was in the variant with double spraying of Zolotokolosa winter wheat variety with growth regulator "Vermyyodis " in a dose of 5 l / ha in the second (optimal) sowing term; relatively net income was higher by 1261hrn./ha compared to the control, the profitability was 33.7 % higher. The cost of 1 ton of winter wheat in this variant was 50.2 hrn/ha lower.than in the control, 90.6 hrn/ ha lower than in the first (early) sowing and 47.5 hrn/ ha lower compared to the third (late) sowing.

Thus, applying crops growth regulators "Vermybiomag " and " Vermyyodis " in presowing seed treatment and under single and double spraying of winter wheat during growing season under different sowing terms, contributed to increase in seed germination and energy, plant hardiness, stimulated crops growth and development and provided significant yield increase of Zolotokolosa .winter wheat varieties in all variants.

The highest increase of winter wheat yield was in the variants with presowing seed treatment with "Vermybiomag " in the dose of 6 l/t and " Vermyyodis " in the dose of 4 l/t and double spraying of winter wheat during vegetation with " Vermybiomag " in the dose of 7 l/ha and " Vermyyodis " in the dose of 5 l/ha growth regulators.

Key words: winter wheat, varieties, growth regulators, yield.

Landscape-geochemical factors of farm soils sustainability in Kiev region

T. Egorova

The paper deals with one of the problems of nature balance with regard to maintaining the ecological stability of the landscape in terms of antropogenesis. Landscape-geochemical conditions and the migration of essential trace elements on the territory of Kiev region are considered as factors of melioration measures effeciency and support environmental sustainability. The problem of environmental assessment of geochemical migration processes of essential trace elements in the landscape of all economic use and possible measures to restore the natural nutrient balance of agricultural landscapes.

The research is based on of ecological-geochemical data "Ecology-2000» and landscape-geochemical zoning. Classification of geochemical landscapes is based on the principles of O. Perelman, developed by the author for the conditions of Ukraine. Assessment processes of geochemical migration essential trace elements in the landscape were the results of calculations of clarks concentration (CC) that take into account soil clarks by H. Bowen, sedimentary sand-clay sediments by O. P. Vinogradov, continental waters by O. Belyakova

Environmental consequences of these landscape-geochemical processes for agricultural soils of Kyiv region are defined. Environmental sustainability of agro-landscapes of the contents of the elements provide the processes of soil formation of scattering them breeds and soil with a

concentration in surface waters. Atmospheric and soil contaminants can move in water environment and messages from piling up in the surface and underground waters. This is the most typical for Korostensky and Morshansky landscape. The natural biological cycle as essential elements and main nutrients, threats that affect negative the processes of humus formation, reduces fertility and contributes to the development of relevant non-communicable phytopathology agriculture futures and in animals.

Alternative options for improving soil fertility should be focused on the organic components of soil and reduce the loss of humus. These include the use of indirect products of farming, which enhance the local processes of biological cycle significantly, as well as a general increase in the volume of organic fertilizers. Along with this, when planning crop rotations, it is important to pay more attention to perennial and one-year grasses, and legume crops that are least conducive to processes of humus mineralization.

Key words: geochemical landscapes, migration, trace elements, self-cleaning, agricultural landscapes.

Sugar beet growth and development features depending on sowing fractions size and genotype

M. Kykalo

Two factors are influencing on plants growth, development and productivity: the nature of organism and the existing conditions of nature. As numerous researches shown on each beet field was well justified by the soil fertility, before root harvesting there are different plant groups by presence weight. Near of 70-80% crop plants constitute average and below average and about 20-30% higher than the average plant mass. The large number of plants average and below average weight reduces sugar beet yield.

This issue was analyzed and many researchers came to the conclusion that beet plants large mass variability on beet field depends, among other things, on different quality seed by size. So important is sugar beet yields features formation study from its different quality and varietal characteristics.

One of the manifestations sugar beet seeds different qualities especially is large diversity in size. On previously conducted studies based was possible to conclude that seed fractional composition, that there are different fractions genetic characteristics predetermined, growing conditions, seeds additional processing to improve its physical properties, such as polishing, etc.

Thus, according to V.N. Dankov and A.G. Matsebery for sugar beet seeds growing in the central forest-steppes of Ukraine fruits of 3.0-3.5 mm fraction was 30.8%, fraction 4.5-5.5 mm - 14.2, in Western Forest 19.3 and 20.2% respectively. According to V.M. Balan research for without planting ways to grow, varietal characteristics regardless, the fruit seeds basic are 3.5-4.5 mm fraction (60-70%) and characterized by high content of fruit fraction 2.5-3.5 mm, especially 3.0-3.5 mm (30-40%).

Sprouting dynamics evaluating, the research years average, it is worth noting the following: a hybrid IVPCHS 84 and Umansky ChS 97 observed sprouting seeds intense in fine fraction 3,25-3,5 mm, compared with the variant where sowing seed fraction 4,5-5.5 mm.

Thus, on the 1st stairs accounting period in hybrid IVPCHS 84 for seeds 3,25-3,5 mm fraction sowing was observed 53.1%, and sowing seeds 4.5-5.5 mm fraction - 51.1% in hybrid Umansky ChS 97 by 54.5 and 52.5%. A similar pattern persisted throughout sprouting period. However, these slight differences should be seen as a tendency and make them crucial.

It is important to note: in IVPCHS 84 sprouts intensity in the initial period (1 st, 2 nd accounting period) was slightly higher than in Umansky ChS 97 hybrid. However, in the future, conversely was recorded more intense sprouting in Umansky ChS 97 hybrid and 100% of their emergence was recorded in almost the same day.

But by one sprouting dynamic is impossible to conclude the advantages or disadvantages of one or another seeds fraction. Another important criterion for stairs assessment is an indicator that determines the stairs obtained number from a given quantity of seed sown, i.e. its field germination.

Sugar beet field germination depends on many factors: meteorological, agricultural, including from laboratory germination and seed size fractions.

In our experiments, all the fractions have high seed laboratory germination rates, which is a research year's average study was 88-95% and, as already noted, was almost the same for all seed fractions. Therefore this indicator is not significantly affected on seeds field germination. Research has shown that sugar beets both forms calibrated seed fractions of 4.5-5.5 mm, 3.5-4.5 mm and 3,25-3,5 sowing provide almost the same field germination.

Thus, of the research years average IVPCHS 84 hybrid fraction 4.5-5.5 mm field germination was 74%, fraction 3,25-3,5 mm of -72%, i.e. the difference between the fractions was 2%, which is within of experiment error. A similar pattern is noted and in Umansky ChS 97 hybrid.

It was noted the insignificant difference in seeds field germination between two sugar beet biological forms. In IVPCHS 84 diploid hybrid it was 72-74% in the Umansky ChS 97 triploid – 69-72%.

Obtained results are confirmed that the seed field germination is largely dependent on meteorological conditions, which consist of pre-and after sowing periods.

Key words: sugar beet, hybrid, seed size fraction, plants growth and development, field germination.

Sugar beet productivity formation depending on agricultural methods of cultivation

L. Karpuk

Sugar beet yield and quality level depends on many complex factors, which in turn provide possibly full disclosure of their genetic characteristics potential. By forming sugar beet of proper quality during their growing season it is important to use different measures of agricultural technologies as raw materials inadequate quality recycling does not give economic effect. Plants growth and development processes strengthening and sugar beet a high productivity formation are impossible without external factors influence.

Effective and efficient measures to improve sugar beet potential productivity is creation of a joint agrochemical background and micronutrient foliar application. Foliar fertilization with microelements promotes synthesis in leaves activation, outflow assimilation as a result of their inclusion in sufficient quantity to roots cells biochemical processes, which ensures their normal growth and creating sucrose accumulation capacity ($C_{12}H_{22}O_{11}$).

In 2010 field research was conducted to determine sugar beet agrophytocenoses optimal parameters and it was found that the best hybrids for extending to November 10 growing season were diploid hybrids Ukrainian ChS 72 and Leopard , which provide stable productivity by optimum plants planting density of 100-110 thousand/ha recommended for this unstable moistening area of the right bank of the central forest-steppes of Ukraine, by the double leaf-feeding in a phase of leaves closure + of 1-1.5 months before harvesting. On field research results based in order to maximize sugar beet plants productivity in unstable moisture areas, it was necessary to conduct a comprehensive experiment that includes the best elements of technology, which has been studied, namely variety - plants density - two shot micronutrients Reacom - plus - beet foliar feeding.

In the research years sowing period and staircase receiving were characterized by moisture small deficiency in the soil, but it almost did not affect on the field germination level which in variations were high and over the years averaged from 86.3% to 87.1%.

Plants uniformity placing in a row observation has shown that the plants placing intervals number in a given interval increases to 3.3% in the variant where was studied Leopard diploid hybrid (58.8% within a given interval), compared with a hybrid Ukrainian ChS 72 (55.5% within a given interval). However, even significant differences in this index, depending on hybrids planting different origin were not.

Under diploid biological forms plants uniformity placement in a row conditions and farming practices complex full use were formed the optimal plants supply area, which contributes to the correct roots formation and strong leaf mass, and ultimately on their productivity affects.

It is established that the average of research years plant density variations before harvesting was optimal for a given area and amounted for hybrid Ukrainian ChS of 101,4-104,3 72 thousand/ha, hybrid Leopard – 101,4-103,9 thousand/ha. There was not density significant difference depending on research hybrids.

Research has found sugar beet diploid forms root yield significant increase by plants double micronutrients foliar application - in closing leaves in a row phase and 1-1.5 months to harvesting. On plants density of 101-104 thousand /ha background and microelements application rate designed for root yield 70 t /ha in the zone of unstable moisture were yield obtained of 56.0 t/ha hybrid Ukrainian ChS 72 and 58.1 t/ha hybrid Leopard.

Both sugar beet hybrids productivity increase ranged from 4.1 (hybrid Ukrainian ChS 72) to 5.2 t/ha (hybrid Leopard) compared with control.

Under the root yield and sugar content increase sugar yield significantly increased in variants, where were spent two times micronutrients foliar application feeding. Thus, in sugar beet hybrid Ukrainian Chs 72 variant with foliar application feeding was 8.8 t/ha, hybrid Leopard – 9.1 t/ha, sugar yield increment – by 0.9 and 1.0 t/ha. There was no significant difference in sugar and gather its gain depending on the hybrids.

Thus, sugar beet agrophytocenoses optimization provided their productivity significant increase. However, under unstable moisture conditions, even with microelements sufficient collateral, high-yield diploid hybrids did not provide a planned productivity - 70 t/ha.

Key words: sugar beets, agrotechnical measures, hybrids, density, microelements, yield, sugar gathering, sugar content.

Germination and productive properties the chelovichesteril'nogo hybrid of sugar beets of drazhovanogo seed of different factions

V. Glevaskiy

The article deals with the definition of biological features and productivity of CS triploid of the hybrid of sugar beets depending on technology of preparation of seed. It is well-proven that quality of drazhovanogo seed depends on the size of technological factions.

Seeds are the important element of modern technologies of growing of sugar beets. Advantages of the best sort or can not be realized by a hybrid without the use of high-quality seed. Therefore for the cost-effective growing of sugar beets with minimum expenses, for the receipt of high harvest of root crops it is necessary to sow seed with a germination 90-95%.

Due to quality of preparation of seed to sowing, precede treatment it by a protective-stimulant it is possible additionally to get matters a 10-12% harvest of sugar beets.

From data of Zadlera V.V. there is direct dependence between large seed and by the productivity of root crops, namely, than more large seed, the higher productivity of root crops. At sowing by seed with mass of 1000 seeds the productivity of root crops made 20,1 gr. 271c/h, and at sowing by seed with less mass of 1000 seeds 17,6 gr. – only 245 c/hectare. The author marks positive connection between mass of 1000 seeds and productivity of sugar beets. With the purpose of increase of the field germination and productivity of sugar beets it is expedient to delete the seed of shallow factions. Seed diameter less than 3,5 mm in a bulk has the low field qualities and little productive. Productivity of root crops at sowing by such seed below on 8-12% what at sowing by more large seed. Factions of seed diameter more large 3,5 mm in most experiments of noticeable difference in the productivity does not give. But between large seed which is passed genetically and them does not have close connection production properties. Not always sorts or hybrids with large seed are most productive. Therefore not by chance selectionists select foremost not after the size of seed, but after the productivity, collection of sugar, technological qualities.

Other authors of Logvinova V.A., Volgin V.V., ShevchenkO A.G. prove that the sizes of seed of sugar beets do not influence on the productivity of this culture. At sowing by shallow

seed diametric 2,8 mm by comparison to the seed of more large factions of 3,5-4,5mm and 4,5-5,5 mm is observed only tendency of decline of the productivity of root crops.

The sugau was identical at sowing seed by different factions.

Researchers constantly conduct the searches of new components of most optimum correlations. Prosecutions are conducted also of improvement of constructions of machines for drazhuvannya, by an improvement physical -mechanical properties of shell and methods of causing of components, by the improvement of sowing qualities of seed. Now almost all use the beet planting countries of Western Europe for sowing only drazhovane or the encrusted seed. In our country, on this time all modern receptions of preceded preparation of seed are used little and need improvement.

The purpose of researches consisted in the study of features of forming of harvest of sugar beets, sowing, the drazhovanim seed of different factions in a concrete area. The chart of experience included the followings variants: 1) sowing encrusted (faction 3,5-4,5 mm) - (control), 2) sowing by drazhovanim seed (faction 3,0-3,5 mm), 3) sowing by drazhovanim seed (faction 3,6-4,0 mm), 4) sowing by drazhovanim seed (faction 3,6-4,0 mm).

It is set research, that garden-stuffs diameter 3,0-3,50 mm even at high energy of germination and laboratory germination, at the lack of moisture in soil in a spring period give low germination, in future fluidized sowing and in end-point low productivity of sugar beets.

Energy of germination of seed of faction 3,0 – 3,5 mm was - 72 %, that on 22% below than control - encrusted seed (factions 3,5-4,5 mm). An especially wide difference (41%) between the indicated variant and control was after the amount of seed which germinated on the third day of growing. The laboratory germination of the encrusted seed of faction 3,5-4,5 mm control - was 96%, drazhovanogo seed of faction 3,6 – 4,0 mm -89%, that on 7% less than control and germination of drazhovanogo seed of faction 4,0 – 4,5 mm was – 91%, below than control on 5%.

We conducted the supervisions of dynamics of appearance of stair depending on the size of factions in the field terms on 14, 16, 18 day. At the insufficient amount of fallouts in May, 2013 a stair of sugar beets was uneven and prolonged.

It is so set research, that the least amount of stair on 14 day - 51%, 16 day -54% and 18 day - 57% the drazhovanogo seed of faction had 3,0-3,5 mm, and most of stair in a variant control - the encrusted seed faction 4,5-5,5 mm on 14 day - 74%, 16 day -75% and 18 day - 82%.

In the drazhovanogo seed of faction 3,6-4,0 mm amount of stair on 14, 16, 18 day was 61%, 69%, 74%. In the drazhovanogo seed of faction 4,0-4,5 mm an amount of stair in certain days was 64%, 68%, 72%.

In the conditions of central part of north Forest-steppe of Ukraine, on black earths typical where conducted research, the lowest productivity of root crops was got at sowing of sugar beets the drazhovanim seed of faction 3,0-3,5 mm – 41,2 t/h and collection of sugar made from an area – 6,67 t/h by comparison to control at the use of the encrusted seed of faction 3,5 – 4,5 mm where the productivity of root crops was more high on 13,0 t/h, and collection of sugar – on 2,60 t/h.

At sowing by the drazhovanim seed of faction the productivity of root crops made 3,6 – 4,0 mm 52,8 t/h, collection of sugar – 8,55 t/h. At sowing by the drazhovanim seed of faction 4,0 – 4,5 mm the productivity of root crops was 53,4 t/h, collection of sugar – 8,54 t/h.

Key words: pelleted seeds, incrusted seeds, triploid hybrids, see fraction, seeds germination.

Meteorological factors influence on uterine sugar beet quality and quantity

O. Balagura

Analysis of meteorological conditions during growing uterine beets showed changes in the region during the 1995-2011. The most arid were 1999, 2003, 2004 (especially in the first half of growing season) and 2007, too wet - 1995, 1997, 2005, 2006, other years - close to the average.

With the dry years the most typical growing season were 2007 and 2011. In 2007 precipitation amount was 74 mm, HTC - 0.6, aridity index - 1.31 during the "closing-sowing rows" period, and during the "closing of rows-harvesting" period – 143 mm, 0.9 and 0.92 respectively. Such meteorological conditions have generally negative affect on beet field agrophytocenoses and, in particular, uterine beets stairs density (field germination), their growth and development and uterine beets output. According to plants standing density of 78 thousand/ha, the average root mass was 291-308 g, uterine output – 46-47 thousand/ha in this year.

With the excessively wet years, the most characteristic in this respect was the 1995 growing season. Amount of precipitation during the "closing-seeding between rows" period was 219 mm, the average temperature - 13.8 0C, HTC - 1.7, aridity index - 0.50, during the "closing of rows-harvesting" period - 248 mm, 17 6 0C and 0.70 respectively. Such weather conditions have positive influence on beet growth and development and generally uterine output. According to plants standing density 190-195 thousand/ha, the average root mass was 320-330 g, uterine – 75-76 thousand/ha in this year.

Hydrothermal conditions analysis also showed that in one of 3 to 4 years a small precipitation amount during sowing (May) was accompanied by an air temperature increase, as shown HTC value - unit and the unit in region. Such conditions negatively affect on field seed germination, contribute plants significant falling out during the "stairs-closing rows" period and eventually to reduce COU. For example, in 2004,by HTC 1.0 during the "closing-sowing rows" period plant stand density before harvesting was 67 thousand/ha, the average root mass – 280-307 g, uterine – 41 thousand/ha, by HTC in this period from 1.7 (2005) - 110-115 thousand/ha, 290-293 g and 81-82 thousand/ha respectively.

It is established that on root mass variation significantly affect meteorological factors during the "closing-sowing rows" period. Moisture lack in the period of plant development leads to their growth delay: in dry years (1999, 2003, 2004, 2007), the average root mass ranged from 270-312 g, wet (1995, 1996, 1997, 2005, 2006) - 289-331 g.

The primary factor that determines root mass variation and its output is density. During 1995-2011 this index analysis showed that uterine beet stand density varies within wide limits: from 67 to 181 thousand/ha in dry years and from 110 to 222 thousand/ha in the wet. Root mass and uterine output was changed under this.

An observations resulted statistical analysis of uterine beet cultivation main indicators was showed that the difference between, for example, the uterine output is exists among different hydrothermal conditions. The correlation coefficient between the HTC, plants density and uterine output were 0.68 and 0.57 respectively.

COU was determined during the spring heaps opening. To do this three hundred root samples were selected which roots loss determined (unsuitable for planting). Final COU was calculated as the difference between the uterine output after harvesting and losses during storage at a rate of area stuffs planting of 70 x 35 cm (40.8 thousand/ha). Researches have shown that uterine roots output coefficient fluctuations depended on the hydrothermal conditions (radiation aridity index), the intensive growth period – from the leaves closing between the rows to harvesting period.

In most of years of roots storage typical conditions were observed COU clear decrease with aridity index increasing. In 1995 (excessively humid aridity index - 0.60) COU was 1.7, in 1996 - 0.92 and 1.8 respectively. In 1999 (arid, aridity index – 1.02) KCOU was 1.3, in 2003 - 1.11, 1.8 and 1.0 respectively.

However, this relationship was not straightforward. During the various roots storage conditions years, it had its quantitative differences. During 1995/96 - 2010/2011 extreme uterine storage

conditions in the DP DG "Shevchenkivske" area was observed of three times: in winter 1997/98, 1998/99, 2006/07.

During uterine storage the weather was very warm in 1997/1998, 2009 /2010 (even this average temperature was positive during this period) roots microbiological processes strengthened and rot infestation increased. Roots loss were: in the 1997/98 year winter – 63,4-64,7% in 1998/1999 – 56,0-57,5% in 2006/2007 – 68.8 – 71.3%.

Key words: meteorological conditions, uterine, plants standing density, uterine output, root average mass, uterine output coefficient.

Ground of mathematical model of organic agriculture system

N. Senchuk

The article deals with the analyzing of determination of the term "organic agriculture". It is recommended to consider that organic agriculture, is the systems of agricultural management of agroecosystems, which are based on the maximal use of biological factors of fertility-improving soils, agrotechnological measures of defence of plants, and also on implementation of complex of other measures which provide ecological, socially and economic expedient production of agricultural goods.

In basis of development of mathematical model of organic agriculture the definition of «Organic agriculture» and «Conception of biology of agriculture accepted higher is fixed for a production ecologically of clean products».

Essence of conception consists in that if on one ton of organic fertilizers more than 15 kg of operating matter of mineral fertilizers are brought in, begins or increases degumification of soils and their agrophysical degradation. This correlation carries the name «coefficient of agriculture biology ».

With the purpose of development of mathematical model for basis the formula of determination of norm of bringing of mineral fertilizers is taken by ball estimation of earth on the size of the programmable productivity:

$$Д_{NPK} = 100\frac{У - (Б \cdot Ц_Б + Д_о \cdot О_о)А}{О_м},$$

where $Д_{NPK}$ - a norm of balanced *NPK* is for the receipt of programmatic harvest, kg/hectare;

$У$ - programmatic yield, c/hectare;

$Б$ - mark of bonitet of soil;

$Ц_Б$ - productive cost of mark of soil;

$Д_о$ - dose of organic fertilizers, t/h;

$О_о$ - recoupment of 1 t of organic fertilizers by the increase of harvest;

$О_м$ - recoupment 1 center of operating matter of mineral fertilizers by the increase of harvest;

$А$ - a correction coefficient on the group of soil.

For the calculation of mass of bedding pus from the different type of animals comfortably to use middle information on the output of mixture of excrements and urine from a conditional head (living weight is 500 kg) is utilized after a formula:

$$M_{n.г.} = n\left[M_e t + M_n\left(t_n + \frac{t_л}{3}\right)\right] \cdot \frac{100 - П}{100},$$

where $M_{n.г.}$ – output of manure, kg;

M_e – mass of excrements from one head, kg/days;

n – an amount of animals in heads;

t_n, $t_л$ – accordingly duration of maintenance of animals in apartments and summer camps, days; t = 365 days;

$П$ – a loss of mass of manure in the process of its storage, %;

M_n – mass of bedding in days on one animal / head.

On condition of the use of punching for the receipt of organic fertilizers there is mass of organic fertilizers which are made in an economy is determined after a formula:

$$M_o = \sum M_{n.г.j} + M_{о.в.}$$

where M_o - mass of organic fertilizers which are made in an economy, ò;

$\sum M_{n.г.j}$ - mass of manure, which is made in an economy, ò;

j - type of animals;

$M_{о.в.}$ - mass of other organic fertilizers.

The amount of forages (in forage units) is needed for maintenance of agricultural animals is determined after a formula:

$$\sum_{j=1}^{n} K_{oj} = \sum_{j=1}^{n} n_j k_{oj},$$

where k_{oj} - a requirement in fordders j to the type of animals.

An amount of forages (in forage units) got as a result of growing of agricultural plants is determined after a formula:

$$\sum_{i=1}^{n} K_{oi} = \sum_{i=1}^{n} \left[У_i k_{oi} (1 - k_{Ti}) + П_{pi} k_{oni} \right] S_i$$

where k_{oi} - amount of forage units in 1 kg of harvest *and* - that culture.

k_{Ti} - coefficient of commodity products (relation of mass of harvest *and* - that culture intended for a sale to general mass of harvest);

$П_{pi}$ - mass of the yeild tailings in a harvest *and* - that culture of appointed on a forage to the animals;

k_{oni} - an amount of forage units is in 1 kg of the yield tailings i cultures.

Using mathematical dependences are higher resulted the system of equalizations which are the mathematical model of organic agriculture which takes into account the structure of sowing areas is got, structure of stock-raising of economy for the receipt of pus, mass of other organic offcuts of organogenic which can be utillized for the receipt of organic fertilizers and «Conception of biology of agriculture for a receipt ecologically clean products».

$$\begin{cases} S = \sum_{i=1}^{n} S_i \\ \sum_{i=1}^{n} \dfrac{100\alpha \left(У_i - Б_i \cdot Ц_{Бi} A_i \right)}{О_{мi} + 100\alpha O_{oi} A_i} S_i - \left(\sum_{j=1}^{n} n_j \left[M_{e\,j} t + M_{n\,j} \left(t_{nj} + \dfrac{t_{лj}}{3} \right) \right] \cdot \dfrac{100 - П_j}{100000} + M_{о.в.} \right) = 0 \\ \sum_{i=1}^{n} \left[У_i k_{oi} (1 - k_{Ti}) + П_{pi} k_{oni} \right] S_i - \sum_{j=1}^{n} n_j k_{oj} = 0 \end{cases}$$

S_i - area of plough-land, which is occupied by an agricultural culture, hectare.

The decision of this system of equalizations is an optimum structure of sowing areas of agricultural cultures and total number of livestock of cattle in an economy for the conduct of organic agriculture.

It is set that introduction of organic agriculture is possible in the economies of stock-raising direction. Certainly, that in the structure of sowing areas specific gravity of green crops is 70 % from the general area of plough-land on traditional technology of receipt of organic fertilizers. Introduction of punching for the receipt of organic fertilizers substantially changes the structure of sowing areas, where полоща under green crops diminishes from 70% to 60%, and the total number of livestock of animals in an economy does not change substantially.

Key words: organic agriculture, manure, harvest, yield, biology of agriculture.

The influence of the plant growth regulators on the yield-capacity of the early ripening potato in the right-bank forest-steppe area of Ukraine

N. Vorobjova

The factors of the formation of the yield-capacity of early ripening potato on the black sod-podzol soil, being created during the processing of the tubers and aboveground mass with the plant growth regulators were investigated.

The application of plant growth regulators is one of the modern directions of yield-capacity and increasing quality of potato. Under their influence the yield-capacity of vegetable plants increases and the quality of the product improves. The application of growth regulators allows us to fully realize the potential opportunities of the plants, given by nature and breeding.

Nowadays the early ripening potatoes should be fertilized carefully, therefore, we applied new plant growth regulators to increase the yield-capacity. So, these questions require more detailed investigations in the conditions of the Forest-Steppe area of Ukraine.

The methods of investigation. The results are obtained by using the accepted field and laboratory methods on the basis of the field experiment and biochemical laboratory analysis using mathematical methods of analysis of variance, which confirm the accuracy of the results of the investigation.

The investigation was conducted on the experimental field of the Department of vegetable growing, which is situated in the Educational and Scientific Department of Uman National University of Horticulture. The investigated area is 40 m^2, including accounted one – 20 m^2. The soil of the investigated field is black sod-podzol loamy soil with well-developed humus horizon, thickness is 40 – 45cm.

A variety of the early ripen potato Latona was used in the investigation. We used such growth regulators as Emistim C, Gumi+, Gumifield, Azotofit, Fitozyd, Potejtin and Biocomplex to process potatoes before planting.

In the investigation we conducted biometric observation, namely: defined in the dynamics the area of the leaf using the method «die-cutting» in cm2 and area of leaf surface in thousand m2/ha; defined the weight of potatoes using «weight for area» method, evaluated the quality of the products according to the State Standard of Ukraine ISO 2165-2002.

The results of the investigation and their discussion. In our investigation, we sought to account for the factors of influence on potato plants and identify plant growth regulators, which could lead to greater growth and accelerate the development of plants in the conditions of open ground, and, consequently, give higher yield-capacity. The indicators of plant growth were the subject of thorough study in our investigation. These indicators are mainly quantitative – the leaf area, the quantity of the leaves, and the total area of the leaves. We defined the leaf area and the total area of the leaves in the period of intensive growth of the plants in the beginning of flowering. According to these indicators we estimated the productivity of plants.

The height of the plants plays an important role in evaluating of growth parameters. The measurement of the height of the plants in the period of intensive growth in the first decade of June showed that the plants were higher when Gumifield, Gumi + and Azotofit were used. Their height

reached the size of 30,4 – 34,6 cm, that had probable difference to the controlled indicators 8,6 – 12,8 cm (in 2011 HIP05 = 5,3 cm, in 2012 – 6,4 cm, in 2013 – 5,8 cm). When the growth regulators Emistim C, Biocomplex, Potejtin and Fitozyd were used the height of the plants was on the level of 23,5 – 28,7 cm, that made the difference to the control 1,7 –6,9 cm.

Stem per unit of area consists of the number of potato bushes and stalks in each of them.

The investigations have shown that a significantly larger number of shoots at a bush had potato plants processed before planting with growth regulators Emistim C, Gumi +, Gumifield and Azotofit – from 6,0 to 6,4 pcs./plant. The lowest indicator was in control – 5,5 pcs/plant. Accordingly the plants of the variants, where the tubers were processed with Potejtin and Biocomplex had the average number of stalks per unit of area – 5,9 pcs/plant.

The improvement of the cultivation conditions of potato, even under adverse weather conditions in the years of investigation, allowed to receive more vegetative mass and accordingly higher yield-capacity. So, the variants where Gumi + and Azotofit were used had the area of the leaves on one hectare significantly higher than the controlled variant – 34,3–34,6 thousand m2/ha. The processing of the tubers with the growth regulators Biocomplex, Gumifield and Emistim C helped to get the total area of the leaves on a level of 33,2 – 33,8 thousand m^2/ha.

When the growth regulators Fitozyd and Potejtin were used the total area of the leaves reached 31,9 – 32,5 thousand m2/ha and exceeded the controlled variant 0,8 – 1,4 thousand m^2/ha.

The increase of the yield-capacity was obtained in the variants where the tubers were processed with Azotofit and Gumi +. It was 5,1 – 5,8 tons/ha. The usage of the growth regulators Biocomplex, Gumifield, Emistim C when processing the potato plants also gave us positive results. In this case, the yield-capacity significantly increased by 3,5 – 4,6 tons/ha. The variant where the tubers were processed with the solution of Fitozyd and Potejtin gave the lowest yield-capacity – 32,4 – 34,06 tons/ha.

Conclusions. Relying on the results of the investigations in the conditions of the Forest Steppe area of Ukraine we recommend to grow potatoes processing the tubers with the plant growth regulators Gumi + and Azotofit. These measures give an opportunity to get 5,1 – 5,8 tons/ha additionally.

Key words: potato early ripening, plant growth regulators, the height of the plants, stem, yield-capacity.

Bioecological features of the development of silver scurf of *Helminthosporium solani* in terms of Ukrainian Polissja

V. Polozhenets, I. Karas, O. Feshchuk

As a result of the conducted researches it is set that external signs of display of silvery favus in Ukraine as well as symptoms of diseases, are tipical for other geographical areas. However, the differences in terms of display of disease has been found out. N.D. Khrobrikh (1952), M.V. Bordukova (1957), A.L. Ambrosov and others (1980) specify that illness begins to show up already in the period of collection. It is marked by the Byelorussian researchers, that at once after collection of tuber of potato does not have signs of illness, and the presence of infection shows up only in a few days in the moist terms of storage as a sooty blotch of blue mold. Our supervisions show that at the optimum terms of development of exciter (enhanceable humidity of soil 90-100%) of sign of display of silvery favus showed up already in the period of harvest. However mainly the first typical signs of silvery favus were observed only in 4-6 weeks if it is a breach of storage, and illness reached at maximal development at the end of storage (April-May). In this period on-the-spot tubers of potato appeared spots of grey or mouse-grey to the color with silvery brilliance, rounded, by a size 1-10 mm in a diameter. Often spots covered considerable part of surface of tuber, especially in its end. On-the-spot spots were well noticeable with a naked eye ultrafine dim black points are sclerotic of exciter which were in the staggered cages of hide of tuber for peripheries of spot.

Rotting under spots was not observed. On tubers, with the mionectic turgor of spot became protuberant in a center and pressed on edges, as a result of what acquired the type of rings. The surface of tubers shriveled thus. After our supervisions of sign of silvery favus especially characteristically showed up on tubers with a smooth light hide, at becoming green tubers and as a result of moistening their water.

It is set that on outside of healthy tubers after holding them in a moist chamber during 10-14 days blue mold exciter of silvery favus was formed.

In depositories black sooty blotch of blue mold usually appeared at the end of storage. A raid was concentrated, mainly, on the border of sick and healthy fabric. It is explained that in the center of spot there is dying off of cages of periderm and mushroom unable to form spore, that is why in the center of spot more light, and for peripheries – dark. A raid consisted of phial ides, that formed on a sclerotium a bunch for 2-5 sht.

For determination of specific belonging of exciter we studied the morphological features of macroconidium, mycelium although it is practically impossible to set specific belonging to mycelium. Therefore we used sizes and forms of macroconidium, amount of membranes, character of crookedness, form of overhead cage and others like that.

The mycelium of exciter of illness is widespread only in the cages of periderm. At first it light, then grows brown. In separate cages, usually, it is on the edges of spots. There are umber bulges which show by itself compression of hyphen of mushroom – sclerotium. Phialide lines, cylinder, darkly olive with partitions. Conidia of inversely- clavate with 2-8 partitions, narrowed on a top, brown, in bases with an umber or black scar, from above light.

The source of infection of silvery favus can be as sick seminal tubers so soil which contains an infection. But a tuberous infection however is basic in pathogenesis of silvery favus, as the use of infectious garden material results in the increase of losses of harvest, than landing of healthy tubers is in the infected soil.

The infection of daughter's tubers of potato takes place in soil, beginning from the moment of potato formation and to the harvest, and, foremost, from a maternal tuber which young tubers are close located round.

It is known that the damage of integrity of periderm of tuber is instrumental in latent penetration of pathogens of other origin. In this connection, we are conduct research in relation to the study of influence of primary infection of *Helminthosporium solani* on a defeat a bacterium *Pectobacterium carotovorumi* by the mushroom of *Fusarium oxysporum.*

It is set that the defeat of tubers substantially strengthened their receptivity silvery favus to mushroom and bacterial illnesses. The analysis of the got results are the higher degree of defeat of tubers silvery favus, the greater amount and top mark of defeat their exciters of fusarium dry and bacterial soft rot.

Key words: exciters, culture, illnesses, potatoes, sort, harmfulness, terms of development.

Potatoes quality (Solnum tuberosum L.) dependence on planting time and microbial preparations treatment in the Carpathian Foothills

V. Koltunov, V. Boroday, T. Danilkova

Elaboration of methodology and assessment of individual agro-ecological zones suitability for potatoes cultivation has become an urgent issue. The variety of options for eco-efficiency of the functional potato dependence on the environment and processing technology in a basic condition for the development of energy-efficient on the environment and processing technology is fundamental in the development of energy-efficient small zone of technological methods of cultivation of potato varieties most suited to specific agro-climatic zones. In addition, the efficiency of microbial preparations is highly dependent on soil and climatic conditions, so the research should be carried out in all regions of the country.

The paper aims at studying the conditions under which the cultivation and processing techniques in the Carpathian Foothills formed minimum number of non-standard potato tubers. The objective

was to study the impact of abiotic factors, the planting time, processing, chemical and biological preparations on potato yield and its structure in the Carpathian Foothills of Lvov region. In addition, similar studies were conducted in different soil and climatic conditions of Lviv region where potato is grown, and in Polissya of Kiev region.

The techniques of the field research are generally excepted. Microbiological preparation Planriz (based on Pseudomonas fluorescence AR -33 , with a titer 2.5 x 109 cells/ml, consumption rate - 1.5-2.0 l/ha). Diazofit - bacterial nitrogen fertilizer (active ingredient - Agrobacterium radiobacter, consumption rate - 0.4 l/ha). Fosforoenterin – a biological product based on phosphorus mobilizing bacteria Enterobacter nimipressuralis 32-3 (FMB - fosforomobilizator), obtained in the biological laboratory of the National Inspectorate of Plant Protection, Lviv region. Potato Treasury early maturing variety and Lileya middle- grade , given the adverse weather conditions of rain Lviv , was planted in the third week of April, the second and the third of May. The Crop was harvested in late August - mid -September.

Application of Planriza, Diazofita, Fosfoenterina and fungicide Ridomil Gold MZ 68 WG in the Carpathian Foothills Fitotsida improved the yield and marketability of the potato, increased the standard parts compared to the control (without treatment). However, the application of microbiological agents compared with the control options in the average showed the formation of a greater number of marketable tubers (66,0-68,7% respectively in the control versus 69,6-80,2%), less tuber diseases (9,1-13,5% against 5,2-9,4%) and small tubers (6,9-10,1% against 5,2-7,8%).

An effective measure proved to be the combined use of Planriz and Ridomil Gold (yield of marketable tubers was 80,3-87,4% compared to 66,0-80,2% in other versions). The using of Planriz + Diazofit+ FMB primarily at 2.5 + 0.2 + 0.2 l / ha and Planriz separately was slightly less effecient.

The 1st planting time was the best in the third decade of April as it resulted information of more standard parts. For the Foothills of the Carpathians, the second panting time was significantly lower. For example, the yield of Lileya of the first term planting exceeded the yield of the second term of planting by 1.3 average, the number of diseased plants increased by 1.2-1.4 times, by - small tubers 1.2-1.8 times. Within three years of the research in all four soil-climatic zones of Lviv region - the most common and marketable tuber yield was obtained from the first planting date, that is, in the third decade of April. The third period - late May - was economically anadvisable.

The impact of polyvalent preparation on the basis of several compositions of microorganisms (Planriz, Diazofit and Fosfoenterin) with eco-physiological compatibility of bacteria is characterized by stability and efficiency in different agro-climatic conditions. Therefore, along with the need to create new high-yielding varieties, it is necessary to develop complex technical measures contributing to realize the potential of certain varieties of agro-climatic conditions.

Key words: Solanum tuberosum L., marketability, quality, planting time, microbiological agents.

Retardants influence on the content of different forms of carbohydrates in potato plants

O. Tkachuk

The assimilates movement speed and direction is determined by the formative processes in a plant's organism. That's why it was the changing of structure of the compounds are transported from the leaves and are reused in growth zones and storing tissues in the plants ontogenesis. The periods of the potato tuber formation and intensive growth influence the regulation of assimilates movement. The potato tubers differ from other acceptors as the processes of new storing cells formation, their growth and starch hoarding simultaneously takes for a long time, however there is the advantage of a process at different stages of growth there. The literature presents only a few and inconsistent data on the effect of growth regulators of the inhibition type on the carbohydrate metabolism in potato plants in ontogenesis. So the purpose of our research was to investigate the influence of dekstrel and paklobutrazol on accumulation and redistribution of carbohydrates in potato plants.

Donors and acceptors form a self-regulating system of the plant. Increasing of the attraction ability of the acceptor zones causes to increase photosynthetic carbon fixation, photosynthetic productivity, particle of the transport forms (sucrose) and outflow of assimilates of plants leaves. Leaves as

photosynthetic organs are donors of the assimilates and growth processes, trophic support and storing organs are the acceptors of the assimilates in potato plants. The formation of tubers and accumulation of starch in potatoes are related processes. The main metabolite arriving from leaves to tubers is sucrose, which is easily used in the synthesis of starch, protein, fiber. We have found out that potato treatment plants with dekstrel and paklobutrazol caused redistribution of different forms of carbohydrate between the organs of plants. Retardants caused the increase of the content of the main transport form of sugars – sucrose-in the leaves of test plants compared with controls.

Leaves growth depends on the photosynthetic products coming from the outside in the early stages of ontogenesis, but the leaves photosynthesis ability to increase in the process of their development. The sucrose content in leaves increases with their growth, and they become a source of sucrose for other organs. The research of the dynamics of carbohydrate content in plants potato of Nevska varieties indicates the retardants influence on the inhibition of shoot growth accompanied with changes in the amounts of these compounds in the plant. A significant intense of growth a increase of the sucrose content in leaves under the influence of retardants was observed. During the period of flowering the sucrose content in leaves dekstrel increased by 5%. In this period acceleration of movement of carbohydrates from the leaves to the tubers, accompanied by an increasing of the sucrose content in tubers was observed.

Studying the starch content in tubers during the growing season shows an increase of this indicator within the time, but plants tubers treated with a retardant are characterized by lower starch content compared with the control. In the second half of vegetation period potato tubers in the variants with retardants treatment grew more intensively and there was reduction of starch assimilation content in the leaves in the variant of 0,025% paklobutrazol treatment was observed because of outflow increasing to the tubers. At the end of the research the starch content in the stems in a variant with 0,025% paklobutrazol treatment did not differ significantly from the control. In all experiment variants at the end of the study there was an outflow of assimilates not only the leaves, but in the roots as well. This was indicated by lower sucrose content and the amount of sugar in leaves, which was accompanied by increase of the total sugar amount content in tubers. it could indicate the increase of the carbohydrate outflow to attraction centers.

Therefore, potato plants treatment by retardants causes redistribution of various forms of carbohydrate between plants organs. The increase of the main transport form of sugars – sucrose compared to the control in the leaves of experimental plants at the early stages of development was determined.

Key words: Solanum tuberosum L, retardants, dextrel, paklobutrazol, carbohydrates.

Yield and quality of soybean seeds, depending on cultivation technology

I. Kudlay, A. Osipchuк, A. Osipchuk

Soy belongs to the most important crops of the world agriculture. Thanks to the combination of two processes: photosynthesis and biological nitrogen fixation, soybean intensively synthesized almost all valuable organic substances. In its grains there are 38-42% crude protein, 18-23% fat, 25-30% carbohydrates, vitamins and minerals. The main task of the Ukrainian breeders today is yield increasing.

The relevant breeding soybean doing increased content of grain protein, fat. Thanks to this, the volumes of the soybean production in the world continues to grow. Being an active clamp of biological nitrogen atmosphere, soy enriches the soil with ecologically pure nitrogen, leaving with crop residues up to 50-90 kg/ha.

The right choice of varieties is one of the decisive conditions for maximum yield. Farmers grow two-three varieties, differing duration of the vegetative period. Soybean is one of the most productive leguminous crops with a high content of grain protein and fat. The amount of area planted with this crop has tended to increase. Soy protein contains essential amino acids, as lysine, threonine, valine 7 %, leucine 1,5 times higher, tryptophan 21% more than the quality standard on protein FAO and the world health organization .

Soybean oil contains about 55% of essential linoleic acid, which is not synthesized by the body and comes only with food. Polyunsaturated fatty acids also oleic - 25%, linolenic - 8%. Saturated fatty acids, such as palmitic and stearic in grain soy compose about 12 %. Carbohydrates soybean (17-25 %) presented a half-soluble sugars: glucose, fructose, sucrose (50%) and insoluble (50%): starch, fiber and others. The first of them is directly absorbed by the body, and others contributed to the activation of useful intestine microflora.

The chemical composition of soy beans is the cause of its use for many sectors of the economy. Primarily, it is the raw material for the oil industry. Products of processing of soy beans, which they get from the press or chemical extraction, widely used in food and technical purposes, and cakes and meal - as high protein supplements to a concentrated fodder.

The aim of the research was to establish regularities of yields and grain quality of different maturity classes soybean varieties, depending on the inoculation of seeds and fertilizers.

The studies were conducted in 2011-2012 in conditions of the Central forest-steppe of Ukraine in the field crop rotation in Terezino in accordance with generally accepted in farming and plant growing methods on blacksoil typical humus in arable soil layer of 3,4-3,6% and pH salt extraction from 6.4 to 6.5. The object of the research - soybean varieties Snow White (early-maturing) and Kyiv 98 (intermediate). The seeds were inoculated on the final density of 600 thousand of plants per 1 hectare. Predecessor - winter wheat. Options fertilizer: 1 - control; 2 - N - 30; 3 - NPK - 30:45:45; 4 - NPK - 30:90:90.

Mineral fertilizers in connection with the variants of the researches made under the major soil cultivation and under spring cultivation. The form of fertilizers - ammonium nitrate (N - 30 %), granulated superphosphate (P_2O_5 - 19) salt and potash (K_2O - 40 %). The research included sowing soybean inoculation risobofitom (2 l/t) seeds and without inoculation. Record harvest was performed by direct harvesting combine “Sampo-130” and weighing from each site, the content of fat and protein in grain soybeans was determined by using the method of infrared spectrometry analyzer NIP Scanner 4250 with computer software ADI DM 3114.

Statistical processing of the data research conducted by analysis of variance. Highest soybean variety Snow White which belongs to the group of early-ripening, received in the version with application N30P90K90 is 31.9 C/ha, while in the application of fertilizers and inoculation of 18,2 C/ha, an increase of 13.7 C/ha Yield of mid-maturing cultivars Kyiv 98 version with application $N_{30}P_{90}K_{90}$ - 26,1 C/ha, whereas in the application of fertilizers and inoculation 15,2 kg/ha, growth of the soybean crop was 10.9 C/ha

We have found that the high content of fat was in the grain variety Snow White and fluctuated within 21,78-22,81 % depending on the elements of technology of cultivation. Range of fat content in the grain of Kyiv 98 varied from 20,02 to 21,92 %.

Analysis of changes of fat content in grain soybean variety Snow White has allowed to establish, that this figure increased to 1.60 to one - 1.94 g/kg per 100 kg of increase of productivity depending on fertilizers and inoculation, and that of Kyiv 98, respectively 1.49 - 1,90g/kg.

In the grain soybeans a low level of domestication contains on average 16-17% fat, and the well-cultivated samples reaches 24-26%. We found that the high content of fat was in the grain variety Snow White and fluctuated within 21,78-22,81 % depending on the elements of technology of cultivation. Range of fat content in the Kyiv 98 grain varied from 20,02 to 21,92%.

Absolute levels of the protein content in grain were largely depended on the inoculation of seeds and activity of the functioning of the symbiotic system. Protein content in seeds was higher at the inoculation held comparison with the similar options for the system of fertilizers, but without seeds inoculation.

It should be noted that the protein content in grain soy depended on the duration of the vegetation period and biological characteristics of the variety and in our research has changed from 39,56 to 42,64%.

Low protein content was in the grain soy Snow White (39,56-40,96 %) and highest one had soybean variety Kyiv 98 - 39,91-42,64 in the context of the researched variants. It is worth noting that

protein had a reciprocal relationship, regarding the increase of the level of yield and fat content in the grain. This relationship continued for all varieties and options experience with doses of fertilizers. We found that for every 100 kg of increase of the yield of protein content in grain of options without the use of inoculation decreased to 2,61-3,00г/kg of Snow White variety; 2,77-3,22g/kg - grade Kyiv 98 and respectively in versions with application of inoculation 2.06 to 2,84 and 2,05-2,14.

In result of studies on the impact of the action of the bacterial preparation risobofit on background of different levels of mineral fertilizers on the yield and quality of soybean grain found that all factors affect these indicators. The highest yield of Snow White soybean variety received in the version with application of fertilizers doses $N_{30}P_{90}K_{90}$ and presowing seeds inoculation is 31.9 C/ha, while in the application of fertilizers 18,2 C/ha, the growth was 12.7 centner/ha, the dependence exists between the yield, content of fat and protein in grains soybeans. So, the higher the yield, the lower protein content in studied grain soy varieties and higher percentage of fat.

So, we have justified the peculiarities of the yields formation and grain quality soybean varieties of different maturity classes, depend on the inoculation of seeds and fertilizers on blacksoil typical for the Central forest-steppe of Ukraine. The highest yield of ripened soybean variety Snow White received in the version with application of fertilizers doses $N_{30}P_{90}K_{90}$ and presowing seeds inoculation is 31.9 C/ha, established stable relationship between yield, content of fat and protein in grains soybeans. So, the higher the yield, the lower protein content in grain of soy in the studied cultivars and higher percentage of fat. The range of change of fat content in seeds of soya in the context of doses of fertilizers application, inoculation and varieties, demonstrates the significant potential of soy on the accumulation of fat in the seeds and growth of its gross harvest of the crop. Absolute levels of the protein content in grain were largely dependent on the inoculation of seeds and activity of the functioning of the symbiotic system.

Key words: soybean, technology of cultivation, fertilizers, bacterial fertilizers, protein, fat, productivity.

The effectiveness of the use of plant growth biostimulators on cucumbers in forest-steppe zone of Ukraine

A. Ternavsky, O. Naklyoka

Cucumber is one of the main vegetables in Ukraine. Nowadays the recommended rate of its consumption is not fully satisfied, it depends upon the increasing demand of food processing industry for primary products. Besides, many agricultural enterprises grow cucumbers using outdated technology (the horizontal method), according to this technology they greatly use hand labor and get low yields (15-18 t/ha).

According to modern market conditions the technology of growing cucumber on a vertical trellis might be very effective. This technology becomes more popular and is implemented in large areas of our country, especially in areas of canning industry. One of the most important tasks of this technology is the selection of effective plant growth biostimulators.

The problem of the use of biostimulators in the Right-Bank Forest-Steppe zone of Ukraine is not studied enough, so it's very important to conduct the research of plant growing using the vertical trellis with drip irrigation. Vertical placement allows to use photosynthetic capacity of plants more efficient, to provide better lighting, heating, promotes higher-quality irrigation, protection against pests and diseases, harvesting.

The research was conducted at the experimental plot of Uman National University of Horticulture from 2010 to 2012. The soil of the experimental plot is podzolized and loam clayed black soil. The humus content – 35%, pH = 6.0, the degree of soil saturation of basic elements - 91%.

The research was conducted with the help of a hybrid of foreign breeding Angelina F1 and with a direct sowing method of cultivation. The seeds were sown in the first ten-day period of May lengthwise the rows with a distance of 15 cm between plants. The variant without the use of biostimulators was taken as a control option. Processing methods were carried out according to the crop and area of cultivation.

For the research we used such agents as Azotofit, Fitotsyd, Vympel and Biolan. Before sowing the seeds were soaked in solutions of biostimulators (Azotofit and Fitotsyd - 3 hours, Vympel and Biolan - 12 hours).

According to phenological observations biostimulators didn't effect on their development. The main seedling stage, the formation of the third true leaf and the beginning the formation of the main stem in all variants observed almost simultaneously - on 8-9, 25-26 and 30-31 days after sowing. Pistillate flower bloom occurred on 40-41 days from sowing. The first cucumbers were formed after 6 days of pistillate flower blooming.

The used agents increased the height of the main stem on 10,5-18,7 cm, the thickness of the main stem on 0,5-1,3 mm and the number of leaves per plant. The area of leaf in influenced samples was at 390-880 cm^2 greater than in the control option.

All applied plant growth biostimulators increased the yield. The highest yield was obtained from seeds treated with Biolan - 52.3 t / ha and Vympel - 50.8 t / ha, which is more than the yield of the control option by 8.9 t / ha and 7.4 t / ha. The yield obtained from seeds treated with Fitotsyd and Azotofit was also higher than the yield of the control option (46,7–49,1 т/га). Biostimulants increased the amount of cucumbers per plant (22,3-25,0 pcs.), the result of such plants was higher than the result of those plants which were not treated with biostimulators (20.8 pcs.).

The marketability of cucumbers in the researched hybrid was quite high (97,1-99,0%), but the highest value was obtained in those plants which seeds were soaked in solutions of Azotofit and Biolan (98,5-99,0%).

Key words: cucumber, hybrids, biological preparations, biometrical parameters, productivity, marketability of fruit.

Investigation of properties of preparation ecoton for environmentally safe technologies of cucumber production

N. Opryshko

Fresh vegetables are essential product of human nutrition. Cucumber is one of the most popular vegetables for eating fresh. No heat treatment leads to increased demands on their quality and safety.

Many scientists consider it is impossible to get high yields without using chemical pesticides. Percent of biological plant protection products in vegetable production is 60-70%, the remaining 30-40% is given to chemicals. The utilization of low-toxic chemicals in modern vegetable production is actual. Chemical entities on base of guanidine are low-toxic chemicals with wide range of antimicrobial properties. The most advanced for use in agriculture is polyhexamethyleneguanidine hydrochloride (PGMG).

The aim of our study was to substantiate environmental and agronomic feasibility of using PHMG (ecoton) in agriculture.

The study was carried out during the 2008-2012 period in the Laboratory of Microbial Ecology, Institute of Agroecology and Environmental Management of NAAS.

Epiphytic mycoflora of seeds can be represented by facultative or obligate pathogens. Pretreatment of seeds protects the plant from seminal, soil or aerogenic infection. The influence of ecoton on epiphytic mycoflora of cucumber seeds was studied. The use of 0,1, 0,2 and 0,5% aqueous solutions of ecoton decreased the abundance of epiphytic mycoflora in 75-90%. The use of 1,0% aqueous solution led to complete sterilization of seeds.

Pretreatment of seeds also should cause the better growth of plants. The effect of different concentrations of ecoton aqueous solutions (from 0,1 to 1,0%) on cucumber seed vigor and length of the roots was studied. The use of 0,5% aqueous solution of ecoton increased seed vigor in 5-7% and led to major root growth. Thus, 0,5% aqueous solution of ecoton was chosen for feather research.

The effect of ecoton on seed vigor and rhizosphere micromycetes was determined by field experiment. In 2008 and 2009 years the weather conditions were not favorable for plant growth. The root rot of cucumbers was wide spread. The use of preparation increased seed vigor in 9,9% (2008th year) and 5,0% (2009). In 2010 the weather conditions were more suitable for cucumber growth. The

use of preparation increased seed vigor in 7,5%. The use of ecoton reduced the quantity of rhizosphere micromycetes in 50% (2008th), 25% (2009th) and 15% (2010th).

Phytotoxicity of ecoton was determined by pot-culture method. The effect of different concentrations of PGMG (from 0,2 to 25,6 g·kg-1 of soil) on the length of the test-culture roots was estimated. The utilization of PGMG in concentration of 0,2 g·kg-1 of soil led to 100 % seed vigor. But the length of the roots reduced in 32 %. The usage of PGMG in concentration 0,4-12,8 g·kg-1 of soil led to 53-100 % seed vigor, length of the roots reduced in 7-56 %. The concentration of PGMG less than 1 g·ha-1 was used for pretreatment of cucumber seeds. So, the utilization of ecoton in concentration 0,5 % for pretreatment of cucumber seeds is not toxic.

Our results showed that the increase in cucumber seed vigor through the use of ecoton can be attributed mainly to disease control. Thus the pretreatment of seeds with ecoton decreased the abundance of epiphytic and rhizosphere mycoflora. Low toxicity and high antimicrobial activity, growth-stimulating properties make ecoton advanced in technologies of cucumber production.

Key words: cucumber, phytotoxicity, polyhexamethyleneguanidine hydrochloride, micromycetes, seed vigor.

Influence growth regulators on the growth processes and productivity of eggplant

N. Sadovska, L. Marhitay, A. Hamor, D. Dikovec

The study was to evaluate the effectiveness of new natural growth regulators Alostim domestic production and processing them for Biolan seeds and eggplant seedlings.

The study was conducted in 2012-2013. The above growth regulators used for the treatment of seeds and seedlings at concentrations of 10^{-3}, 10^{-4} and 10^{-5} %. In the control option for handling used distilled water. To study the effect of growth regulators on the subsequent growth and development of plant seedlings of both varieties in phase three leaves treated with solutions of the same concentration, followed by cultivation in open field.

During the research determined the laboratory germination and vigor of seeds. Spending phenological observations, biometric measurements.

Using growth regulators in the lab first steps have been noted in a variety of ways with Almaz at a Alostim concentration of 10^{-3} and 10^{-4} % and grade in the form of Helios at a Biolan concentration of 10^{-4} and 10^{-5} % for 4-5 day1. In all other ways, including the control, the mass of shoots noted for 9-10 days.

The average number of seeds like the end of the experiment in the form of Alostim in concentrations as high as 10^{-3} % in grade 90 % Almaz and 94 % in grade Helios. Performance of similarity higher than control at 19 and 16 %, respectively.

Soak the seeds in a solution Biolan gave the best results for the use of the drug at a concentration of 10^{-5} %. Here germination Almaz grade higher than the control by 21 % and grade Helios – 16 %. Share sprouted seeds reached in these grades 90 and 96 %, respectively.

Using Alostim in concentrations 10^{-3} and 10^{-4} % period from sowing to germination in a variety of Almaz decreased by 4 days, and the variety Helios - 3-4 days compared with controls. Significantly accelerated the emergence of seedlings in cassettes and seed treatment Biolan at a concentration of 10^{-4} and 10^{-5} %. Stairs Almaz appeared 3 days and Helios - 3-5 days earlier than in controls.

The above concentrations of both growth regulators significantly affected, and the subsequent formation and growth of seedlings . In particular, the reduced time of appearance of the first true leaf to a fully -formed seedlings (6-8 developed leaves). In the embodiment of Alostymom in concentrations 10^{-3} and 10-4 it was shorter than in controls , an average of 3-4 days, and the use Biolan in concentrations 10^{-4} and 10^{-5} % - 5-6 days that affected the reduction of the length of all seedlings period.

Seedling quality largely depends on its mass as a whole and aerial parts and root system in particular. Both growth regulators used in concentrations a positive impact on the value of the studied

parameters. Under the influence of mass Alostim aerial parts increased by 2,4-3,6 g compared with controls. Weight of roots increased in seedlings of plants of the same variety only use concentrations of 10^{-4} and 10^{-3} %, while an increase of 1,2 and 0,9 g, respectively. The total mass in options ranged 9,2-11,9 g, while in the control it reached 7,3 g

In grade Helios accumulation of wet weight in seedling period under Alostim took place more rapidly than in grade Almaz in all variants. Increase in wet weight for control was 1,5-2,4 g.

Biolan proved effective in concentrations of 10^{-4} and 10^{-5} % with the increase of mass aerial parts compared to the control amounted to 3,5-4,9 g diamonds for Helios - 3,9-4,4 g weight of the root system plant seedlings in Helios influenced Biolan was significantly greater than Alostim treatment. The total mass of plant seedlings of both varieties reached maximum values for use in Biolan concentration 10^{-4}% . Increase root mass was greatest for the use of the same drug at a concentration of 10^{-5} %. It reached 1.3 g in both varieties.

Both growth regulators significantly stimulated plant growth in seedling period and after planting them in open ground. The highest plant seedlings at the end of a period of two varieties formed by use Biolan solution at a concentration of 10^{-4}%. Thus, the increase in height to control diamond grade was 25.6 %, and in grade Helios - 27.7 %. In the embodiment of Biolan at a concentration 10^{-5} % increase was 11,7 and 10,9 %, respectively.

The growth regulators affected the subsequent phases of plant development both varieties. In the phase of flowering plants were highest in the version with a concentration Alostim 10^{-4}%. Growth in height compared to the control is reached for Almaz 39,0 %, and for Helios – 25,3 %.

Using Biolan greatest difference in height of plants in comparison with the control variant noted in the variants with drug treatment seedlings at concentrations 10^{-4} and 10^{-5}%.

One of the important parameters characterizing the efficiency of growth regulators is the value of the crop. Using tangible Alostymu an increase harvest to control for both grades obtained on the variations of drug concentrations 10^{-3} and 10^{-4}%. Note that yield greater gain in experiments with Alostymom stood Class Diamond (from 2.1 to 3.5 t/ha). The maximum of this sort was the yield from processing plants in the seedling stage drug solution at a concentration of 10^{-4}%. Its average yield reached 25,1 t/ha, while in the control – 21,6 t/ha.

Biolan showed greater efficacy for its use in concentrations of 10^{-4} and 10^{-5}%. Increase in crop from the use of this drug was higher compared to Alostim and was 3,7-4,1 t/ha in grade Almaz and 5,0-5,3 t/ha in a variety of Helios. The maximum yield in both years of research grade Helios is distinguished by the use of Biolan. Thus, in 2012, the yield on its version of the drug concentration reached 10^{-4} 32,4 t/ha in 2013 – 33,2 t/ha. In an embodiment the concentration of 10^{-5} magnitude of yield was 32,7 and 33,5 t/ha, respectively.

Key words: growth regulators, seed, crop quality, seedling, eggplant, productivity.

Phytomass increase of apple-trees depending on rootstock type, intercalary insertion, planting density and pruning terms

V. Zamorskyi

Biomass accumulation is a complex mechanism which shows a complicated relationship of apple-trees with environmental conditions and main agro technical factors. The efficacy of the relationship proves yielding capacity level and total phytocoenosis productivity. New rootstock types and intercalations which explain intensive designs of apple tree orchards are studied in modern horticulture.

Phytomass increase correlates with a fruit tree age, and during ontogenesis the accumulation occurs due to lateral branching and considerable reduction of an apical growth. It has been recorded, that sprout rather than rootstock plays an important role in a monthly rate of phytomass increase. It has been proved that architectonics and phytomass structure depend on cultivar peculiarities, a rootstock type, an application of various pruning terms.

We set a task to identify the effect of a rootstock type, intercalary insertion, planting density and pruning terms on phytomass increase of the apple trees under the conditions of the Forest-Steppe Zone of Ukraine.

The experiments were carried out at the department of fruit production and viticulture of Uman national university of horticulture in 1991-2010 (the university is located in the Forest-Steppe Zone of Ukraine). Trial 1 was planted by Professor H.K. Karpenchuk in spring of 1981; one-year-old Idared and Melrose trees of Yugoslavian production were planted on rootstocks M.9, MM.106 with a 4-m row. The spacing for young trees on rootstock M.9 was 1,5, 1,75, 2,0 m (thickening, 1667, 1430, 1250 trees/ha respectively), and that on MM.106 – 1,75, 2,5, 3,0 m (1430, 1000, 833 trees/ha). Trial 2 was laid by the author of this paper in spring of 1989; planting scheme was 5x3 m, young trees of Rubinove Duky and Idared cultivars and intercalary inserts of vegetative rootstocks M.9 and MM.106 (various vigor levels) were used. Control trees were grafted on vigorous Antonovka rootstock. Two pruning terms of the trees under study were applied: winter and summer. A type of a crown was a slender spindle. Winter pruning ("winter") was performed using traditional industrial technology. Time for summer pruning ("summer") was determined when the beginning of an active differentiation of a growing-point in experimental variants was observed. P.Ye. Shumylo's technique was used to define phytomass increase.

In trial 1 phyto-mass increase (PI) of Idared trees on a dwarf rootstock M.9 when they reach the age of 10-12 years was insignificant and ranged 0.5–1.0 kg/tree, which is due to abundant yield in this period (up to 14.3 kg/tree).

In the following years PI increased, but it fluctuated in different years, PI reduction correlating with the increased yield load of the tree. Idared trees on MM.106 rootstock had higher indicators of PI, however at the age of 10-12 PI reduction had a similar tendency as in the case of growing on M.9 rootstock. A 12-year-old period has to be emphasized, during this period PI reduction was recorded – 1-2 kg/tree, which is explained by steep yield increase during this period.

In the years of experiment in trial 1 planting density (PD) had a considerable effect on PI only when rootstock MM.106 was used and this can prove an optimal choice of planting scheme for dwarf rootstock M.9 and the establishment of a possible margin limit when trees are densely planted in a row and MM.106 rootstock is used.

Based on disperse analysis data, a dominating effect of a tree age on PI (67%) is recorded, but quite a sufficient effect of a rootstock type is observed (14%). Planting density had an important effect only when trees were grown on rootstock MM.106 (5%).

According to the research results in trial 2, PI depended on variety specific features, an insertion type and pruning terms of apple trees. PI increased till the eighth vegetation and was much higher in vigorous cultivar Rubinove Duky (up to 9.2 kg/tree). PI decreased considerably in vegetations 9-10 in all variants (cultivars Rubinove Duky and Idared) which was due to unfavorable phyto-sanitarian conditions of the plantations.

Idared trees had the highest indicators of PI, up till vegetation 8, in variants when seedling rootstock was used both under summer and winter pruning, and in combination with insertion M.9 – till vegetation 9 and winter pruning. Thus, winter pruning enhances PI of apple trees when they are grown on weak vegetative insertions.

Based on disperse analysis data, an insertion type had an important effect on PI (41% - Idared, 40% - Rubinive Duky); the age of the trees was of great significance (29% - Idared, 32% - Rubinove Duky).

The cultivation of apple trees on a seedling rootstock enhances phytomass increase, whereas weak intercalary insertions reduce it considerably. As the tree gets older, phytomass increase gets slower, depending on a rootstock type, a pomological cultivar and a pruning term.

Key words: apple tree, intercalary insertion, phytomass.

Tocopherol effect on the peas' germination (Pisum sativum L.) and formation of its biological productivity

M. Kolesnykov

Salt stress leads to disruption of physiological – biochemical functions of the plant organism limiting its yields. Pea is a non-salt resistant culture. One of the effective methods of plant adaptation stimulation salt stress is the use of antioxidant drugs. Tocopherol (TPh) is a power fulnatural antioxidant can affect the activity of the antioxidant system.

Objective. Find out features of the effect of biometrics index, the state of oxidative processes under the salt stress during germination of peas and the formation of its biological productivity.

Materials and methods. The object of the study was pea "Gotivskii" (PisumsativumL.). Seeds were soaked in solutions of TPh (0,01; 0,1; 0,5; 1,0 g/L) and germinated in Petridishesunder controlled parameters during 7 days long. The solution of 0.1 MNaCl was used for the induction of salt stress. The TBA-AP, proline content, the rate of protein oxidative modification, catalyses activity were determined in the course of the experiment. The laboratory germination, length and weight of seedlings and roots were determined. The vegetation experiment was carried out at the experimental field of Agrotechnological and EkologyFaculty. Sowing rate 100 seeds/m2.Anareais 2.5 m2. Crops of peas were treated with tocopherol (0,01; 0,1 g/L) twice. The leaf area index (LAI) of peas crops and the number of pods on the plant, number of seeds in pod, weight of 1000 seeds, biological yield were determined.

Results and discussion. Sprouting peas for 7 days showed that pre-sowing seed soaking in TPh solutions account for a change in the biometric index. Laboratory germination of pea seeds treated TPh in0.01 - 0.1 g/L concentration increased by 9% and 20% compared with plants on saline background. The fresh weight of 7 day-old pea' seedling sand roots increasing by 15 % and 26% were found and the dry weight increasing by19% and 28% were found, respectively, in the case of pre-sowing soaking in solutions of TPh. The length of seedlings and root were increased under the influence of TPh (0.01-0.1 g/l) in comparison with untreated seeds. High concentrations of TPh leads to reduction of the weight and length of pea plants.

The LPO processes intensified under the salt stress. The TBA-AP content raised in the pea tissues under this condition. The TPh treatment reduced the TBA-AP content at seedlings and roots by 17 and 27% in comparison with control plant.

Salt stress inhibited the catalyses activity in the studied pea plants, but exogenous TPh stimulated the activity of catalyses in a wide range of concentrations. Moreover, it is noted a direct correlation between the catalyses activity and the concentration of TPh. The increase of proline synthesis occurs during the development of the stress response and proline accumulation is response of the plant organism. The proline content reduced to the level of plants that germinated in the water under the influence of low TPh concentrations. However, TPh (0.5-1.0 g/l) caused hyperexpresion of proline.

Peas are high-protein crops, thus the oxidative modification of proteins negatively affects the use of the processes of plastic exchange. So, the content of OMP carbonyl group increased by almost 2 times in sprouts and pea roots under the salt stress. The application of TPh has reduced the rate of OMP by 35 % in seedlings and by 60 % in the roots.

Photosynthetic apparatus of plants is a sensitive marker to stress of different nature. It was shown that TPh stimulated the growth of pea leaves apparatus, the LAI increased in1,6 times. T Ph foliar treatment of peas crops effect on yield formation. The number of pods on the plant increased by 4.4% and also the number of seeds in pod increased by 5.0%, 1000 seeds weight increased on 3.8 g under the TPh (0.1 g/l) treatment. The biological pea yield increased by 20 % under the use of TPh.

Implication. Tocopherol in 0.01-0.1 g/l concentrations increased seedling biometric index at pre-sowing soaking pea seeds. TPh treatment led to the normalization of oxidative state of pea plants under the salt stress and this increased salt resistance of peas. TPh significantly increased the LAI under the crop's foliar treatment, slightly increased the number of pods on the plants, the number of seeds in a pod and weight of 1000 seeds, led to increasing of peas biological productivity by 20%.

Key words: peas, tocopherol, salt stress, productivity.

Influence of gooseberry parent plants growth regulators treatment on rooting of green cuttings based on conditions of parent plant cultivation

O. Kobets

In recent years the hybrid thornless (or almost) gooseberry species have been the most tradable in industrial and domestic horticulture. Due to the high demand for planting stock of these species there is a need for development of ways for faster receipt of such planting stock.

Research goal – estimation of efficiency of the physiologically active substance use during the preparation of parent plants for reproduction depending on the conditions of parent plant cultivation (in hothouses or open ground).

The research was carried out with the following gooseberry species of current Russian selection: Grushenka, Sadko (511-19-2), Pushkynskyi, Nizhnyi, no.15-15- (Zelenyi doshch).

The following plant growth regulators were used:

2-CHEPA - 2-chloroethyl phosphonic acid (ethephon, ethrel), which belongs to ethylene producers.

Pix - mepiquat chloride. Belongs to quaternary ammonium compounds.

Indole butyric acid (IBA, hormodine) – ß –(indole 3)- butyric acid. Belongs to synthetic auxin analogue.

Two weeks before plant cutting the experimental parent plants in hothouses and in the open ground had been sprinkled with plant growth regulators solutions - 2-CHEPA in concentration 0,035%, pix -0,004%, pix – 0,008%. During the same period the controlled plants were sprinkled with water and the cuttings of the controlled plants before planting were treated with indole butyric acid solution in concentration of 30 mg/l during 18 hours. Green plant cutting was carried out according to the conventional technology. The cuttings, which underwent plant growth regulators treatment were planted for rooting without auxin treatment.

All cuttings were planted according to 4x7 scheme.

The rooting substance is black peat and sand 1:1 with lower lying muck layer (10-15 cm). Cuttings were enrooted in a hothouse with a swing -fog machine. Periodicity - thrice repeated with 50 cuttings in a variant.

In autumn, at the beginning of September, the cuttings, which took root (%) and growth (mass) of rootlets' assemblage have been calculated and examined.

As research has shown the influence of physiologically active substance on green cuttings' rooting was characteristic for each separate species.

For Grushenka species the growth regulators treatment of parent plants was effective only for plants, which grew in hothouses and underwent 2-CHEPA with concentration 0,035% treatment. The rooting percentage increased by 1,4 as compared to previous checking.

The Nizhnyi species plants proved to be more receptive of growth regulators treatment. Almost all ways of treatment made positive influence on rooting percentage: owing to keeping the parent plants in hothouses and 2-CHEPA (0,035%), pix (0,004%) substances treatment the rooting percentage reached 69,9% and 73,7% accordingly, which is almost 3,5 times better than that of the control variant. In all research variants the cuttings of the plants cultivated in hothouses took roots better than those grown in the open ground.

As for Pushkynsky the most effective was pix in both concentrations: rooting increased by 1,3-1,5 times. In variant with 0,004% the cuttings of the plants from open ground, beyond expectation, took roots better (20%) than cutting of plants grown in the hothouses.

Sadko species plants had also specific reaction. The 2-CHEPA chemical treatment was effective only for the plants cultivated in hothouses; its use resulted in twofold rooting increase. 0,004% pix treatment gave almost 100% rooting. Higher chemical concentration overtook the difference of cuttings' rooting from differently cultivated plants. The difference is inessential. Compared to the control one, this way of treatment allowed double increase in the rooting percentage.

Preparation of parent plants had influence not only on the percentage of cuttings, which struck roots, but also on the quality of newly grown root system.

Positive influence of parent plants preparation by means of 2-CHEPA treatment was noted of Nizhnyi and Sadko species' cuttings of parent plants cultivated in the hothouses. 0,004% pix was even more effective for these species. Under its usage the roots mass increased by 2 times for Nizhnyi and by 2,5 for Sadko as compared to the best control variant.

For Grushenka species only 0,008% pix was effective - the roots mass increased by 1,5 times for hothouses plants' cuttings . In other variants no substantial progress occurred.

Pix of the same concentration (0,008%) substantially improved the quality of Sadko species cuttings. Root mass increased by 2-2,5 times as compared to control.

Therefore, physiologically active substance use for new advanced species of gooseberry parent plants essentially improves green cuttings' rooting, especially for the species, which have naturally lower ability for vegetative reproduction (Nizhnyi species). Plant growth regulators efficiency increases under condition that parent plants are grown in hothouses (unheated cellophane film hothouse).

Key words: gooseberry, softwood cutting, productivity, retardant, pellicle hothouse, artificial fog.

Selection of melon varieties and hybrids for cultivation in greenhouses for solar heating

S. Kubrak

Experimental work carried out during the years 2009-2011 at the Kiev Experimental Station of the Institute of Vegetables and Melons. The study was conducted in greenhouses on the solar heating area of 500 m2. Preceded by - sweet pepper. Seedlings were grown in a glass greenhouse winter and spring. Seeds were sown in plastic pots 10x10 cm during the second decade of April. Melon seedlings planted in the greenhouse when the soil temperature in the morning at a depth of 10 cm was 14-15 °C.

According Kiev Experiment Station, the most critical for plant growth and development melon during 2009-2011 period were the weather conditions in May. Temperature and humidity fluctuated considerably. The minimum temperature in May was 5-7 °C, i.e below the minimum for melons (10 °C). The average daily relative humidity for 2009 was at 60 % and in 2010 – 82 %. Changes in temperature and humidity caused subsidence of the first flowers and ovaries. This would extend the length of the ripening of the first fruits.

The first and last melon fruit harvested selectively, next - at regular intervals. Maturity of fruit was determined by the ease of separation of the fruit from the stalk, the softening of the final part, yellowing, the emergence and strengthening of the hybrid characteristic flavor.

We studied 40 spices of melons, including the new ones that came on the market: Evdokia (Russia), Assol F_1 (Russia), Yuzhnaya zvezda (Russia) Sympathy F_1 (Russia), Gull (Ukraine), Melba (Russia), Roxolana F_1 (Netherlands), Holdi F_1 (France). Control were: Council F_1 hybrid and variety Titovka (for quick and Middle), Samara (for middle). Repeated-time in the nursery. Discount land area was 5 m^2.

For the duration of the period from germination to fruit ripening first medium (70-80 days) were the following varieties and hybrids of melon: Temptation F, Roxolana F_1, Holdi F_1, Evdokia, Melba, seagull, Hoprynka, Sympathy F_1, Yuzhnaya zvezda. Among them were those in which the length of the growing season would be shortened, or was on par with the control of the Council of F_1 and Titovka where thisfigure averaged over three years by 74 and 75 days.

By the middle of varieties and hybrids (80-90 days) were classified such as: Valenciano, Honeydew, Fortune, Buharka, Alina, gonna F_1. The first fruits of them ripening on average three years for 1-2 days before grade 3 control Samara (85 days), but the variety Buharka (86 days).

The yield of melon hybrids, on average over three years of research, was lower than the control F_1 and the Council constituted under 0.5 (Holdi F_1) to 1.2 kg/m^2 (Sympathy F_1). The highest rate was observed in this hybrid Goldie - 4.5 kg/m^2.

In 2009 the highest yield varieties characterized Medium gull and Hoprynka respectively 5.4 and 5.1 kg/m^2, whereas when control Titovka this figure was only 4.8 kg/m^2. At the lowest it has been in grades Melba (3.7 kg/m^2) and Yuzhnaya zvezda (3.7 kg/m^2).

Over 2010 varieties yield Evdokia and gull control Titovka exceeded by 0.7 and 1.3 kg/m^2. The low she was in grade Yuzhnaya zvezda - 3.4 kg/m^2.

Yield middle grades were not significantly higher than the control variant Samara and in 2011 was 6.5 kg/m^2. The highest figures were in grade Alina – 5.7 kg/m^2, the lowest – 2.9 kg/m^2 in class Valenciano.

On average over three years of research (2009-2011) yield only some Middle samples was essential in comparison with the control variant. Thus, the rate of the class seagull, was 5.9 kg/m^2, which is 1.4 kg/m^2 greater than control Titovka where it was 4.5 kg/m^2. This can be explained by the fact that the variety was great fruits that average weight was 1.5 kg, while in other samples it was 1.2 or 1.3 kg.

The average weight of a standard fetus in Middle hybrids and middle grades did not exceed, or was on par with control of the Council of F_1 and Samara. Plants hybrids formed small fruits mass from 1.0 to 1.3 kg, which is typical for quick forms. In the middle grades melons are options where the figure was 1,0 (Honeydew), 1,2 kg (Alina, Valenciano) and samples with higher fruit weight of 1.7 (Fortune) to 1.9 kg (Buharka).

As a result of the research material collection is divided into early melon varieties and hybrids, with the duration of the vegetation period of 70-80 days and the middle, where the figure was 80-90 days. The highest average yield and marketable fruit weight was observed in grades Seagull, Samara, Buharka and Fortune.

Key words: melon, pellicle hothouse, sorts, hybrid, productivity, mass, commodity, garden-stuff.

The yield capacity of the beetroot varieties and its hybrids under the the Right-bank Forest-steppe of Ukraine conditions

V. Keckalo

The aim of the research included the increase in the yield capacity of beetroot in the right-bank Forest-Steppe of Ukraine by selecting of high-yielding varieties and hybrids of foreign selection. The experimental part of the research was conducted in 2011–2012 on the experimental field of the Department of Vegetable Growing of Uman National University of Horticulture. The Harold (USA) and Detroit (France) varieties were investigated. The Hopak variety (Ukraine) was served a control one. The Zeppo F1 variety (Netherlands) was a control Boro F1 and Pablo F1 hybrids (Holland). The sowing was performed during the second decade of April according to the scheme 45×10 sm (222,2 thousand pcs./ha).Technological works were carried out according to the requirements of the growth and development of beetroot. The yield was harvested in the first decade of October and sorted according to the requirements of the 7033:2009 «Beetroot fresh. Technical conditions National Standard of Ukraine» according to the phenological observations and characteristic of varieties and hybrids.

The early ripen varieties include Boro F1, Pablo F1, Zeppo F1 and Harold. During the beam ripeness phase a domestic variety of Hopak (control) had larger number of leaves. The crops of Detroit variety formed 11 leaves less. The number of leaves of the hybrids was 20–27. Zeppo F1 hybrid (a control variety) had higher number of leaves, and Boro F1 hybrid – lower. In technical ripeness phase the crops of the Hopak variety and Zeppo F1 hybrid formed more leaves – 15 and 12 pieces respectively.

The length of the leaf plate in the beam ripeness phase was larger in the varieties and amounted to 19,3–20,6 sm, whereas in the hybrids the length was 15,6–16,5 sm. A similar trend was observed in the phase of technical ripeness of the roots. The average weight of leaves made 22,3-28,5 % of the total weight of the crop in the phase of beam ripeness– 10,6–16,2 % in technical ripeness phase.

The total yield capacity was 38,8–63,5 tons/ha. The cultivation of the varieties allowed us to obtain 48,0–52,2 tons/ha of production. The Harold variety was more yielding. The hybrids provided 38,8–63,5 tons/ha of roots and Boro F1 was the best one – 63,5 tons/ha. The total yield capacity was divided into the product and non-product. Among the varieties Hopak (control) formed less amount of marketable roots – 41,3 tons/ha with the marketability of 86,2 %. Larger amount of marketable

products output was observed in the Harold variety – 47,2 tons/ha with 90,3 % marketability of the roots. Zeppo F1 hybrids (control) had lower indexes – 36,3 tons/ha in the cultivation however, the marketability of the roots was 93,6 % Boro F1 Hybrid had higher yield – 56,2 tons/ha with the roots marketability of 88,5 %.

According to the average data of 2011–2012 the Harold variety formed larger weight roots – 240 g, and the control variety had lower indexes – 220 g. The diameter of the roots was 8,5–9,2 sm and the Harold variety (control) had higher index. This index in Detroit and Harold varieties was at the same level and was 8,5 and 8,6 sm correspondingly. During the cultivation of the Boro F1 hybrids formed the roots of higher weight – 300 g, and hybrid Zeppo F1 (the controlled hybrid) had lower weight – 180 g. The diameter of the beetroots of the hybrids was of 8,8–9,6 sm on the average.

So, the investigated varieties and hybrids of the beetroot of foreign selection are can be used cultivation in the Right-bank Forest-Steppe of Ukraine. The processes of coming and passage of phenological phases of plants in hybrids were faster compared with the varieties. As for the biometric indicators in beam phase and technical ripeness larger indicators were determined in the varieties. During cultivation of the varieties beetroot yield capacity of increased in comparison with the controlled one by 5–14 %, which corresponds to 2,1–5,9 tons/ha. In the hybrids this indicator was 42–55 % and 15,3–19,9 tons/ha, accordingly. Harold Sort and Boro F1 hybrid had the best weight indicators.

Key words: beetroot, variety, hybrid, root, yield capacity.

Agrobiological features of Highbush Blueberry varieties (Vaccinium corymbosum L.) woody stem cuttings breeding in the right bank of Steppe of Ukraine

A. Pyzhianova, A. Balabak

Highbush blueberries perspective varieties planting material volumes and technology in Ukraine nurseries does not meet the needs of horticultural farms or farmers or gardeners lovers.

Culture and its highbush blueberry varieties introduction and their economic and biological characteristics and properties maintaining largely show the need and prospects lignified stem cuttings reproduction.

Research was focused on regularities subordinate root formation processes passage study that determine woody stem cuttings of the root system formation and the agricultural practices of individual varieties of seedlings growing blueberry (Vaccinium Corymbosum L.) improvement based on stem cutting technology in the agro-climatic conditions of the Right-Bank Forest-Steppe of Ukraine.

Research object: the process of planting material blueberry quality creation, depending on the varieties, characteristics, shoots and timing of harvesting and biologically active substance KANO (10 % solution of potassium salt of α-naphthalene acetic acid) cutting concentrations.

The subject was: own-rooted seedlings blueberry varieties cultivation in promising conditions for the Right-Bank Forest-Steppe of Ukraine – Blyukrop (Bluecrop), Blyugold (Bluegold), Duke (Duke), Darrow (Darroy), Elliot (Elliot), Spartan (Spartan), Toro (Toro). Researches were conducted in Uman National University of Horticulture, National Park arboretum "Sofievka" NAS and "Brusvyana" private enterprise nurseries.

It is found that blueberry varieties (Vaccinium Corymbosum L.) lignified stem cuttings has a low regenerative capacity, and their rooting depends on variety, planting and harvesting dates on escape rooting zone. It is shown that blueberry varieties stem cutting methods improvement can be achieved by inducing of rizogenesis woody stem cuttings activity of biologically - active substance auxin nature KANO with optimum application rate of 20-35 ml /l in the Right Bank Forest-Steppe of Ukraine. Three-node cuttings and quadrangular, harvested from the basal part of the shoot, processing KANO aqueous solution at a concentration of 25-35 mg/l, rooted, depending on variety, within 88,2-95,3 %, which is 17,4-73,7% higher than the control experiment embodiment.

The optimum period of blueberry cuttings propagation organogenesis studied for woody stem cuttings, which coincides with deep rest mother plant (October-November, March) period. It is

established that research varieties are characterized by high vegetative productivity, which is a biological basis of their own roots reproduction.

The number of woody stem cuttings internodes and nodes determine their regenerative capacity, a decrease in their number less than three or four accompanied by all parameters of root formation significant decrease. It is found that the highest regenerative capacity observed in cuttings from the basal part of the shoot harvested the lower – from the medial part cuttings, and the lowest - in the apical cuttings. The number of rooted, raw biologically -active agent KANO , quadrangular basal cuttings for example Blyukrop grade was 45.4, a three-node - 40.1, two nodes - 25.9 and 11.3% of single node. The number and length of adventitious roots was also significantly dependent on cutting type and 2-3 times higher than in a single-node variant of research and two nodes cuttings.

Blueberry seedlings varieties selection and cultivation is one of the important aspects of fruit growing in the forest-steppe zone of Ukraine. Their limited distribution mated with the biological characteristics of cultivation and breeding effective methods insufficient research. Therefore, agronomic method improvement is accelerated stem cuttings reproduction and has theoretical and practical importance.

Key words: highbush blueberry, varieties, stem cuttings. regeneration, root development, cuttings, cuttings terms, cuttings type.

Prospects of Kharkov region agriculture in the production of biofuels

A. Fesenko, A. Soloshenko, V. Bezpalko

The article discusses the possibility of the Kharkiv region for growing and processing of sugar beet and rape to produce more environmentally alternative fuels - ethanol and biodiesel.

Ukraine has a significant level of anthropogenic load. Under these conditions, optimizing the environment is strategic and urgent task for the state. One of the most important aspects of its solution is the transition from fossil fuels into alternative sources.

The agrarian sector of Ukraine can be considered as a promising energy supplier through the cultivation and processing of crops, which is a source of biomass. It is interesting to experience fuels biomass for car. Transportation is a powerful consumer of traditional fuels and the most powerful source of air pollution.

A positive example of bioenergy technologies is the use of rapeseed oil. It can successfully replace diesel for tractors, automobiles, ships and so on. Biodiesel is incompletely environmentally friendly. Thus, the combustion of biodiesel reduces by 8-10 % allotment of carbon monoxide, nearly 50 % soot and significantly less sulfur. It is only because of the high oxygen content products of its combustion contain about 10 % more nitrogen oxide than petroleum diesel fuel. Biodiesel fuel has certain technical advantages over diesel, although some drawbacks, including reduced capacity by 6.8 %. In case of contact with soil or water biodiesel for 25-30 days, is almost completely decomposed and does not harm the environment. Rape can be grown in the fields of irrigation, in the contaminated territories by the addition of radionuclides.

Lately methyl and ethyl alcohols are used as a source of fuel. Bioethanol is a mixture of gasoline and ethanol. Ethanol is formed with containing sugar plants during the fermentation. Ethanol is brought to 100% strength remove residual water. Even adding 10% ethanol reduces greenhouse gases, carbon monoxide by 20%. Ukraine plans to produce bioethanol at the ethanol plants and sugar mills. This will help in the 2013-14 biennium to reopen the 34 enterprises of alcohol industry, particularly in the Kharkiv region. The raw materials for bioethanol production in Ukraine will use molasses and other sugar beet production intermediates. The best variant is the production of sugar and ethanol in one company.

It was converted for the production of bioethanol distillery plant in w. Ivashki of the Kharkiv region. The production capacity of the plant is 21000000 liters alcohol or 60000 liter per day, it is needed to produce 7.3 tons of raw material. The company enables annually additionally get almost 20 tons automotive fuel. The Kharkiv region grew 875.6 thousand tons of sugar beets. It can be obtained approximately 30.65 tons of molasses and to produce 91.95 tons of ethanol. It fully covers the needs of the plant for raw materials and creates opportunities for expansion of the industry within the region.

Rapeseed production in Ukraine is export-oriented. The Kharkiv region produced to 10.1 thousand tons in 2011. Of these materials it could be obtained about 3.4 tons of biodiesel.

Features of the Kharkiv region in raising sugar beet allow to use three of its processing plants and mutually adjust fuel ethanol volume and sugar. This will increase the number of jobs, reduce distance transport of sugar beet, and expand acreage of sugar beet to reducing social tensions in the region. Sugar beet is a valuable crop in the rotation. Implementation of the state program on the use of biofuels would help to expand the cultivation of this crop, normalizing rotation and providing better soil conditions.

Thus, modern agricultural production within the Kharkiv region creates a very promising environment for development of alternative energy.

Key words: bioethanol, biodiesel, molasses, sugar beet, rape.

Soil cultivation systems and fertilizer levels influence on its biological activity under barley

A. Pavlichenko, S. Vahniy

Soil cultivation - is one of the agriculture system and crop production technologies basic elements. Among the factors that affect on yield, soil particle is 7,5-17,4%, that indicating operations process and energy amount importance.

Soil cultivation had a significant impact on changing nitrogen and ash elements content and availability of plant nutrition in soil is very important and timely.

Fertility preservation and restoration important condition is ensuring ecological agro-ecosystems balance and microorganism's activity. Among the soil microflora important functions is its participation in the humus formation processes, carbon cycle and in biologically active substances synthesis.

In the early of twentieth century V.R. Williams emphasized that active microorganism's activity is occured by plowing than soil cultivation.

According to V. Yamkovyi the linen fabric decomposition intensity in the soil after polytsevyy and bezpolytsevyy soil cultivation was almost the same. However, under the ploskoriznoyi and surface systems are observed biological activity in the soil layer 0-10 cm intensity, which in the layer 10-20 and 20-30 cm decreases, and it is the cultivation lack.

In this connection, the goal of our study was the soil cultivation and fertilizer levels influence determines on its biological activity under the barley.

Crops farming equipment in the experiment is typical for research institutions and advanced farms zone. Under the barley growing was used the same machines, tools and equipment, which manufacturing farms are equipped. This was aided by the engineering field experiments technique and organization. As mentioned above, the area under the variants and areas is sufficient in size for the conventional units application.

In our researches, soil biological activity evaluation we spent by the linen fabric decomposition intensity in soil and the selected carbon dioxide number. It is known that carbon dioxide is the organic matter end product mineralization and therefore respiration rate (selection of carbon dioxide) may serve as an indicator of soil biological activity.

In our researches soil biological activity in the rotation is somewhat higher and observed by the polytsevyy system than by the combination and long shallow. The lowest figure was by the bezpolytsevyy systematic cultivation. Thus, in the early of barley growing season (from 1 till May 30) for the control cultivation system the maximal soil biological activity was observed in the layer of 0-10 cm, which made fertilizer and stubble remains, and in the layers 10-20 and 20-30 cm biological activity was decreased. By the combined and extended shallow cultivation was observed similar tendency. The highest biological activity of 0-10 cm soil layer is clamped by the systematic bezpolytsevyy cultivation. Thus, during this period, the linen reducing to the initial mass in the layers 0-10, 10-20 and 20-30 cm soil being respectively: by the systematic polytsevyy cultivation of – 17.8, 16.5 and 15.1%, systematic bezpolytsevyy – 21.9, 13.3 and 10.7%, combined – 19.7; 14.6 and 12.0-20.1 %, long shallow – 14.3 and 11.6%.

During the barley growing season the arable layer biological activity by black soil polytsevyy cultivation increases due to the microorganisms spread throughout its profile.

Within two months (from May 1 till June 30) linen fabric weight reduction in 0-10, 10-20 and 20-30 cm soil layers amounted to: by the systematic polytsevyy cultivation of 28.3, 27.3 and 23.2 %, systematic bezpolytsevyy – 33.4, 22.9 and 17.1, by the combined – 30.3, 26.1 and 19.3 and a long shallow – 30.3, 25.9 and 19.3%.

The difference in linen fabric weight reducing in the arable layer under barley for the period of the 1 to 30 May and from the 1 May to 30 June amounted to – 1.2 and 1.8% by the systematic bezpolytsevyy, 1.1 and 1.1 % by the combined system and 1.2 and 1.1 %long shallow – for systematic polytsevyy system. In May the number of carbon dioxide evolved per day, according to a systematic polytsevyy system was 6187.0 mg/m^2, systematic bezpolytsevyy – 5830.7, 5849.3 by the combined system and continuous shallow – 5901.5 mg/m^2, in June 8194.1, 7898.1, 7913.3 and 7990.6 mg/m^2, respectively.

The great importance in the soil biological activity regulating belongs to the cultivation systems. In the rotation soil higher biological activity was observed by the polytsevyy system than the combination and long shallow.

The highest biological activity of 0-10 cm soil layer was clamped by the bezpolytsevyy systematic cultivation. Within in two months (from May 1 till June 30) was observed a linen fabric weigh decrease in 0-10, 10-20 and 20-30 cm soil layers.

Key words: soil treatment, the level of fertilizer, soil biological activity and barley.

Effect of complex application of herbicides and biolan on productivity and structural indices of soya plantations

Z. Hrytsaienko, O. Holodryha, L. Rozborska

According to its chemical composition soya belongs to most valuable and rare plants in terms of a complex of its characteristic features. It uniquely combines the most important organic compounds – protein and fat (60% of seed mass) – the main components of its seeds, and 25% of carbohydrates, a complex of enzymes, vitamins and mineral substances. Therefore, soya protein and fat, their high content, good digestibility and availability for people contributed to rapid development of its world production and wide abundance in the southern part of Europe. The expansion of the area under soya is the way to increase soil fertility, replenish food resources and solve the protein problem in the world. Soya belongs to crops with low competitiveness with weeds. Thus, taking into account its high susceptibility to weed infestation, especially at the beginning of vegetation, and impossibility to protect the sown areas by means of only mechanical measures, chemical method remains an inseparable part of modern technologies of soya production.

Purpose and tasks. Wide abundance and harmful effect of weeds is one of the main reasons of poor yields of soya in all the areas of its cultivation. Extermination of weed components from areas under soya is the key prerequisite for increasing crop yields. This problem can be solved through the application of different weed control systems during tending of crops basing on agro-technical and chemical methods and their combined application. It is practically impossible to reach full weed extermination even applying highly effective weed control agents. Therefore, it is important to reduce the quantity of weeds to the level which is safe for the crop.

Research results. Soya yields are a complex index formed as a result of interaction of numerous environmental factors and biological properties of the variety itself. The efficiency of preparations used for treating soya crops to some extent defines the yields and quality of seeds.

The conducted research resulted in the establishment that the applied preparations influenced positively soya yields during all the years of the research. Together with this, simultaneous application of herbicides with Biolan facilitated the improvement of physical, chemical and structural indices of soya yields.

Thus, under the application of Gezagard 500 FW at the rate of 4,0 and 5,0 l/ha soya productivity increased by 5,6 and 5,8 cwt/ha respectively as compared to the control. At the same time under simultaneous application with Biolan the crop productivity increased by 7,7 and 7,8 cwt/ha as compared to the control. Similar results were also received after the application of Decilet applied at the rate of 0,6 and 0,8 l/ha. Here the crop productivity comprised 19,4 and 19,6cwt/ha which exceeded the control by 6,8 and 7,0 cwt/ha. Simultaneous application of Decilet with Biolan helped to increase the yield to 8,9 and 8,7cwt/ha which was the highest index of all the experiment variants.

Thus, under the application of Gezagard 500 FW at the rate of 4,0l/ha the quantity of beans was within 22,7 pieces and the quantity of seeds was 52,8. Simultaneous application of Gezagard 500 FW at the rate of 4,0l/ha and Biolan helped to increase the indices to 25,1beans with the quantity of 60,5 seeds. Under the application of Decilet at the rate of 0,6l/ha the quantity of beans was within 23,5 pieces with 62,0 seeds. Under simultaneous application of Dicelet at the rate of 0,6 l/ha with Biolan the quantity of beans and seeds increased to 27,2 and 64,6 respectively.

In the period of three years the weight of 1000 grains in the control variant was on the average of 136,4 g., at the same time in the variant with the application of herbicides it was within 145,0-148,0 gr. Under the application of herbicides with Biolan the indices increased to 151,3-153,0 gr. Grain unit was increasing depending on the rates of herbicides and their combination with Biolan. The highest grain unit was also observed in variants with simultaneous application of herbicides and Biolan.

The content of protein and fat in seeds is an important qualitative characteristic of crop productivity of leguminous plants including soya. Their content also determines the nutritive and feeding value of soya. The content of "raw" protein and fat depends mainly on the soya variety peculiarities, which explains the reason why content of the given indices does not differ greatly. At the same time "raw" protein and fat yield demonstrates more clearly the difference between variants which depended on the crop productivity. The application of the tested preparations facilitated the improvement of conditions of formation of the yield and therefore, the increase of "raw" protein yield as compared to the control.

The highest yield of "raw" protein among the variants, where Gezagard 500 FW was applied, was observed under simultaneous application with Biolan which was 7,23 and 7,12 cwt/ha according to the rates of application while in the control variant it was within 4,34 and 4,82 cwt/ha, and 4,82 cwt/ha in the variant with Biolan.

The highest yield of "raw" protein of all the variants was received due to the application of Decilet with Biolan which comprised 7,65 and 7,6 cwt/ha. At the same time the content of "raw" fat was also observed in bigger quantities which comprised 4,47 and 4,43 cwt/ha respectively. In the variant with the application of Biolan on its own, the yield of "raw" fat was 2,74 cwt/ha and 3,28 cwt/ha in the variant with hand weeding. In the variant with the application of Gezagard 500 FW, the content of "raw" fat depended on the rate of application and combination with Biolan. The highest indices were observed at the application rate of 4,0l/ha together with Biolan 20ml/ha which comprised 4,14 cwt/ha.

Conclusions:

1. Herbicides Gezagard 500 FW c.s. and Dicelit c.e. positively influence on the reduction of weed infestation on areas under soya which resulted in twice as big yields. In addition to this, structural, physical and chemical indices of seed quality improve.

2. Simultaneous application of herbicides with Biolan makes it possible to reduce the herbicides rates, pesticide stress of the environment and promotes biological technologies in soya production.

Key words: soya, herbicides, growth regulator, Gezagard 500FW, Dicelit, Biolan, structural data, mass of 1000 grains, nature of grain, "raw" protein, "raw" fat, efficiency, yield.

The insect's fauna of the pea agrocenosis

N. Shushkivska

Observations and counts for 2006-2013 years in the research field BNAU shown that agrocenoses pea dominated beetles (Coleoptera) - 40 % of all insects, second place wasps (Hymenoptera) - 17.3

%. Large number of species represented bugs (Hemiptera) (14.7 %) and flies Diptera (10.7 %). Share rest ranged from 1.3 to 8 %. Among the number of beetles (Coleoptera) polyphagous dominated by species that have links with many forage legumes and other crops. Specialized is a pea weevil (Bruchus pisorum L.). Large number of species represented polyphagous family weevils (Curculionidae), which is 52.6 % of all identified beetles. Among them dominate nodules weevils (Sitona sp.), beet leaf weevil (Tanymecus palliatus F.) and aoromius 5-punctatus (Tychius quinquepunctatus L.).

Share beetles entomophagous is 38.2 %. These are mainly representatives of the families Carabidae and Coccinellidae.

As the number of dominated beetles Harpalus rufipes Deg. and Calathus halensis Schall.

Among Coccinellidae dominated seven-spot ladybird (Coccinella septempunctata L.) and constituted 46 %. Imago ladybirds appeared simultaneously with the appearance of aphids. The maximum number of larvae on plants that reached 36 specimens /100 waves of butterfly-net, observed during the flowering of culture.

A number of Hymenoptera in agrocenosises pea to a large extent (86.1 %) presented with entomophages superfamily Chalcidoidea and family Aphidiidae .

Among the identified thrips (number Thysanoptera) entomophages is predatory thrips (Aelothrips fasciatus L.), which kills aphids, thrips, etc. other. Trips pea (Kakothrips robustus Uzel.) are plant-feeder. The average density for the study was 16 speciments /100 waves of butterfly-net.

Ubiquitous pea aphid (Acyrtosiphon pisum Harr.) (number Homoptera). The growth of aphids took place at the beginning of budding pea, its density averaged 56.4 specimens / plant.

In the colonies of aphids found Syrphidae predatory fly larvae (number Diptera). There were flies tahini, larvae are mostly parasitic in insects (2 specimens /100 waves of butterfly-net).

In pea crops in small amounts detected harmful flies: Delia platura Mg. (family Anthomyiidae) and Phytomysa atricornis Mg. (family Agromyzidae) and Contarinia pisi Kieff.

Pea populated harmful butterfly (number Lepidoptera): pea moth Laspeyresia nigricana Steph. (family Tortricidae), limebean pod borer Etiella zinckenella Tr. (family Pyralidae), scoops Autographa gamma L., Scotia exalamationis L., Amathes c-nigrum L. and others (family Noctuidae).

Bug Lygus pratensis L. (family Miridae) was the most widespread among plant-feeder Hemiptera. Predatory bug Nabis ferus L. (family Nabidae) is entomophages in agrocenoses peas. Chrysopa perla (L.) representative number Neuroptera (family Chrysopidae). Larvais and adults attack aphids.

Other insects do not belong to the common people, they are numerically small and have no special significance. Their share is 1.2 %.

Formation entomocomplex on crops of peas is gradually during the growing season. Its structure in different periods of plant development consists of species that migrate from other habitats and those that overwinter in the fields, where the crops.

For plant-feeder that are the greatest threat to crops include nodules weevils, aoromius 5-punctatus, pea aphid, pea thrips, limebean pod borer, pea moth, pea weevil.

Key words: plant-feeder, entomophage, insect pests, predator, agrocenoiss, pea.

The accumulation of carbohydrates in the ontogenesis of white lupine for using ryzobofits and plant growth regulators

S. Pyda, O. Tryhuba

The actual problem of Ukraine nowadays is biologization of agricultural production. One of the ways to solve it may be using of the biological products based on the active strains. The activation of plant-microbial interactions is a powerful factor of increasing the productivity of agrocenosis. Although it is not used in agricultural practice. An important type of such interaction is legume-ryzobialnyy symbiosis.

Among the variety of legumes white lupine takes an important place. Initially it was grown as an ornamental plant and later as a green manure crop. The productive value of white lupine has grown

especially after the breeding of bezalkaloyid varieties that are suitable for using in animal feed and food industry.

However with breeding of new varieties of intensive type there is a need to improve technological methods of cultivation of white lupine, considering its biological characteristics that directly affect the yield and quality of leafy weight and grain, that is relevant and requires scientific justification in the Forest zone of the Western Ukraine .

In recent years in Ukraine and abroad was created a number of plant growth regulators (PGR) of a new generation which are widely used in agriculture. They increase the resistance of plants to adverse factors of natural or anthropogenic origin: critical temperature extremes , moisture deficiency , toxic pesticides , defeat disease and pest damage .

The results of researches and productive tests indicate that the usage of PGR in agriculture is one of the most affordable and highly profitable agricultural ways to increase crop productivity and improve their qualities.

The effect of some growth regulators on the productivity of nitrogenfixed symbioses was studied in the experiments with peas, alfalfa, soybeans. Scientists have shown that the usage of PGR increases the crop yield and their resistance to pests and diseases.

The aim was to determine the influence of pre-sowing seed treatment ryzobofitom from Bradyrhizobium sp. (Lupinus) strains 367a and 5500 /4, PGR Stimpo, Rehoplant and their compositions on the accumulation of restoration , mono -and ketosugar in leaves of white lupine varieties of Diet and Serpnevy during the plant ontogenesis.

The research was conducted with plants of white lupine (Lupinus albus L.) varieties of Diet and Serpnevy (derived in NSC " Institute of Agriculture of NAAS of Ukraine ").

Ryzobofit was made at the Institute of Agricultural Microbiology and agricultural production NAAS of Ukraine (Chernihiv) . The basis of the creation of preparations PGR Rehoplant and Stimpo (manufacturer BF ISTC " Agrobiotech ") is the synerhiynyy effect of interaction between products of biotech cultivation of fungus Micromycetes that was extracted from ginseng root and preparations of the metabolic products of Streptomyces avermitilis.

The field experiments were laying on a grey forest soil plots of Kremenets Botanical Garden with the grades same scheme: 1 version – control, the seed is not treated , 2 – inoculated seeds before sowing by ryzobofitom from Bradyrhizobium sp. (Lupinus) strain 367th (default), 3 – ryzobofit , strain 5500 /4 , 4 – seeds treated before sowing by PGR Rehoplant 5 – PGR Stimpo 6 – ryzobofit , 367th + PGR Rehoplant 7 – ryzobofit , 367th + PGR Stimpo ; 8 – ryzobofit , 5500 /4 + PGR Rehoplant 9 – ryzobofit , 5500 /4 + PPP Stimpo.

The carbohydrate contents were calculated in mg/100g of dry substance by determination of reducing sugar micromethod. The indicators were established during the periods of onset and passing fenophases: stalking, budding, flowering and green beans. Statistical analysis of the results of studies was performed using Microsoft Office Excel.

The carbohydrates are important structural components of plant cell, the main source of energy for its life processes , perform an essential role as intermediate products of many biochemical cycles that determine their fundamental importance in the processes of plant growth and development. They play an important role in the adaptive reactions of the organism to the adverse environmental factors of environment (low temperature and drought). The exchange of carbohydrates, their conversion and connection with other substances is an integral part of the overall metabolism of plant organism.

The researches have shown that carbohydrates (saccharides recovery, mono-and ketosugar) in leaves of white lupine are largely dependent on the varietal characteristics of plants, stages of ontogenesis and seed pre-treatment by biological agents.

It was found that the leaves of both varieties of white lupine are more accumulated than in the phase of stalking. In the ontogenesis of plants the amount of studied forms of carbohydrates decreased due to the redistribution of organic substance in the generative organs.

In the budding phase in the accumulation of monosaccharides in the leaves of plants a similar pattern was observed with the phase of stalking. The most intensive accumulation on renewable and ketosugar was affected by the preplant treatment of seeds by ryzobofit composition , strain 5500/ 4 + PGR Rehoplant that 14.10 % (sort of Diet) and 24.64 % (sort Serpnevy) respectively more controlled.

During the flowering phase the content of the aforementioned forms of carbohydrate in the leaves of both varieties of white lupine also decreased but a similar pattern in their accumulation was observed in comparison with the stalking phase.

In the phase of green bean the carbohydrate amount in the leaves of plants was the lowest. In this phase of plant growth and development the most effectively influenced on the accumulation of carbohydrates the monocultivation of PGR Rehoplant seeds.

In the Ukrainian Western forest the influence of seed treatment by ryzobofit was researched on the basis of Bradyrhizobium sp. (Lupinus) 367a strain, 5500/4a, and plant growth regulators Stimpo, Rehoplant and their compositions on the content of carbohydrates in the Lupinus albus L. leaves of Diet and Serpnevy sorts is investigated. It was shown that seed treatment by plant growth regulators and their compositions with ryzobofit contributes the most significantly to the accumulation of mono-, keto-and renewable saccharides in the leaves of stalking phase.

Key words: Lupinus albus, plant growth regulators, ryzobofit, carbohydrates.

The use of biology as a factor in increasing welsh onion's productivity

G. Slobodjanik, V. Voytsehovsky

The questions of vegetables' organic cultivation require a detailed study of biological technology without the usage of pesticides. To extend the range of vegetable production on open ground draws attention to the rare plants of onions, that includes welsh onion. This type of onion is characterized by early maturation, forming crop false succulent stems and green leaves that are harvested from early spring to late autumn. Depending on sowing and planting is grown as an annual and perennial crop. In Ukraine similar studies on the impact of biological tolerance and yield Luke Welsh onion was not carried out.

The aim of the research was to evaluate the effects on growth, development and productivity of biology on welsh onion, which have fungicidal and stimulating action and rational definition of spray mixtures.

Welsh onion plants of Piero's grade were sprayed by working solutions of studied biology such as Liposam (0.5 l/ha), Biocomplex BTU (1.5 l/ha) and Fitotsyd (1.0 l/ha). The multiplicity of spraying four times. Liposam – improves wetting of waxy, smooth leaf surface and absorption elements by foliar application. Biocomplex BTU – liquid microbiological fertilizer based on microbiological bacteria of the genus Bacillus subtilis, Azotobacter, Paenibacillux polymyxa, Enterococcus, Lactobacillus, balanced plant nutrition provides and protection from the wide range of pathogens. Fitotsyd – wide range of effect chemical fertilizer.

Scheme of planting 45x20 sm. Welsh onion was cropped in the first decade of September from annual plants by the vegetative method of reproduction. More favorable conditions for the destruction of onion's plant Puccinia porri observed in 2012.

The highest rates of biometrics in plants sprayed by Liposam + Biocomplex BTU + Fitotsyd . The number of subsidiaries stems was 4.8 pc. / plant, leaves were 25.9 pc. , stem diameter – 22 mm, which is almost two times higher than in untreated by biologicals plants. Lower biometrics of Welsh onion sprayed by biology Liposam + Fitotsyd. Not processed biological products plants Welsh onion formed 2.9 pc shoots diameter up to 12 mm, the average height was 20.7 cm, number of leaves - 14 ps. Spraying welsh onion plants by solutions of biology has greater impact on the level of branching, leaves' covering and diameter of subsidiary shoots than on their height.

The least damage by rust was noticed after spraying welsh onion by preparations Liposam + Fitotsyd – 5.8% and Liposam + Biocomplex BTU – 6.1%. The prevalence of rust on unprocessed areas reached on average two years of studies of 20.4%.

The capacity of Welsh onion planting annuals sprayed by biologicals Liposam + Biocomplex BTU and Liposam + Biocomplex BTU + Fitotsyd was 284-361 g/plant that for 55,2-72,7% dominates the mass of plant version control. In the structure of yield 55-63% weight stem of welsh onion's and the rest mass of green leaves.

On average after the two years of research the highest crop capacity of welsh onion was noticed after complex spraying by biology Liposam + Fitotsyd + Biocomplex BTU – 35.1 t/ha. In 2012, when the high level of plants' damage by rust was observed the yield of this variant was 33.5 t/ha, that for 14.4 t/ha more than from the plantations where biology were not sprayed. Productivity of plantations, processed drugs Liposam + Fitotsyd on average two years amounted to 25.6 t/ha, of the option of making Liposam + Biocomplex BTU - 31,5 t/ha.

So spraying welsh onion by solutions of biology in combination Liposam + Fitotsyd + Biocomplex BTU provides during the growing season and harvest time low plant's damage by diseases, promotes greater biomass, higher quality and productivity. High level of biometrics and productivity of plants Welsh onion treatment on the background biology Liposam + Biocomplex BTU.

Key words: welsh onion, subsidiary sprouts, biologic, rust, crop capacity.

Some special features of surface runoff of diverse origin

A. Pitsil, I. Budnik

The paper considers the influence of economic territories on the quality of water objects and gives hydrochemical indices of the surface runoff from various functional zones of the city. The authors estimate the discharge of pollutants which get into the hydrographic network with the surface runoff.

The purpose of the given research was to investigate the ecology of diverse origin surface runoff, which comes from different territories, taking into consideration some special features of its formation and the pollution degree, as well as to reveal its influence on the hydrographic network pollution.

The studies were conducted in 2006-2012 at the Research Institute of Regional Ecological Problems of the Zhytomyr National Agroecological University and in the Zhytomyr municipal sanitary-and-epidemiological station's laboratory.

The samples of the surface runoff (SR) were drawn by means of the analysis of rain water in the final pipes. The sampling was carried out by rations (1litre). To obtain the detailed information on the SR, each selected sample was analyzed. In order to systematize the sources of surface water pollution on the territory of the city, the authors selected different functional zones, namely those with predominant multistoried buildings (water intake 1), with predominant individual private houses (water intakes 2-3) and industrial zones (water intake 4).

The sewerage network at all water intakes is fully separate and is represented as gravity-flowing sewers; unloaded storm-water sewage gets without treatment straight into water sources of the city.

The basic typical pollutants of SR from the municipal water intakes are non-soluble substances. Depending on the characteristic of a catch basin their concentration varies from 8 to 150 mg/l. The mean values of indices that characterize dissolvable organic substances (biochemical oxygen consumption – BOC_5, chemical oxygen consumption –COC) in sewage water from the city territories varies within the limits of: by BOC_5—from 10.8 to 27.8 mg O_2/l; by COC – from 34.6 to 67.7 mg O_2/l.

The content of petroleum products in surface water is assessed by the traffic intensity. The value of their content in sewage water from the city's surface is within 0.02-3.5 mg/l.

As a rule, surface sewage water contains a number of biogenous elements (nitrogen compounds up to 3.4 mg/l; moreover, approximately half of the nitrogen is in the ammonium form, nearly one-

third is in the structure of organic compounds, the rest are nitrites and nitrates; phosphorus constitutes nearly 0.5 mg/l).

Among the numerous factors and processes that influence pollutants on their way from a water source to a final pipe the authors revealed the length of the pollutant transport way, which is estimated by the size of a water intake and by its hydrological-and-geological features.

As a result of the investigations conducted, the authors found that the substance concentration in SR from the surface of motor roads varies widely and depends on the traffic density, hydrological conditions, topographic features, industrial pollution sources, etc.

Thus, the concentration of chlorides in the snow on the roadside was 60 to <0.3 mg/l, in the snow cover directly on the roadway it was 365 to 3.8 mg/l, in the road surface water flow -- 4,900 to 7.5 mg/l, and it reached the ceiling values directly at the discharge pipe outlets beyond the range of motor roads (5,800 to 14 mg/l, this being three times higher in comparison with the same indices of surface runoff, which was formed in the agroforest part of the water-shed area. The similar tendency was observed by other indices.

Key words: surface runoff, water, diffusive pollution.

Phytoindication the Teteriv river surface water basin by pH

T. Vasylyuk, V. Dema, V. Pazych

The current status of most rivers in Ukraine is largely influenced by human activity. This led to the degradation and breakdown of water and basin ecosystems. One of the most important directions in modern biological research is studying aquatic macrophytes as indicators of aquatic environment objects .

The purpose of our study was to determine the quantitative distribution of species and indicator species in shallows thr Teteriv river by their pH.

The Teteriv River is located in the Dnipro River and is a right tributary of the first order. It is a region of diverse and intense human impacts on all components of the environment. To determine the effect of species pH and quantitative distribution of aquatic plants we made geobotanic description of the. Teteriv river ecosystems using the phytoindication method in 11 observation points, which differ in the level and nature of human activity.

Among the species of macrophytes that grow within the basin of Teteriv River 45 ones are of phytoindicate value. In general, there are 96 recorded species of vascular plants in the Teteriv River basin most of these plants belong to Equisetophyta, Magnoliophyta, Equisetopsida, Magnoliopsida, Liliopsida, including 15 orders, 20 families and 28 genera. The absolute majority of macrophytes in this region are monocotyledonous plants. Consequently, more expressive indication signs are observed in monocot plants. A significant similarity in species composition was revealed at all points of observation.

Studies have shown that water of the Teteriv River , the most weakly alkaline, is characterized by a wide range of changes in pH (from 1 to 6), as a result of the combined effects of both natural and anthropogenic factors. As a result, in aquatic ecosystems of the Teteriv River pH fluctuated significantly - from 6.0 to 8.43 during the study period. However, the average pH level usually does not extend beyond 1 category, corresponding the water gradation from "excellent" in some cases to "good" and "satisfactory" Create a disturbing number 4 and number 5, located in Zhytomyr regions in clusters of industrial and residential facilities where fixed negative impact of industrial and sewage treatment from the city. The unfavorable situation in the alignment number 10 (r. Stryzhivka) where water samples were taken at locations of large livestock farms .

This situation has affected both the qualitative and the quantitative characteristics of the indicator macrophytes. Specifically determined that pH greatly affects the species diversity and assay of plants growing in shallow Teteriv River. So at the point of observation recorded 96 species of vascular plants. The nature of the distribution and composition of vegetation communities in different parts of

shallow observation has both general and specific features. Particularly, we found out that hydrochemical parameters pH and vegetation in the study area are related.

The highest number of plants is observed in the environments where the pH was neutral or alkalescent. Maximum number of indicator plants grow in an environment with a pH of 7,5-7,6 - 34 species. Thus in these areas vegetation associations are represented in all three groups of macrophytes (the alignment 1 and 9). In alignment with pH fixed <7.5, the vegetation. It changed from a mosaic type overgrown shallow water on mosaic thicket (with large amounts of air and water vegetation) as well as a significant growing light demanding species (the alignment № 2, № 3, № 4). All ranges (the alignment № 2-6) differ by zonal type intermittently overgrown with little variety of indicator species (18-26 species). Shallow vegetation consists mainly of Carex and Glyceria strips of reed and cattail phytocoenoses narrow in more in-depth areas.

After analyzing the indicator species on a scale of acidity 8 species of evrybionts were defined like in other regions of Ukraine the majority of the group is comprised of neutrophils - 61.3 %.

In all parts of the group of higher aquatic plants (especially air- water) occupy a large area, and thus form a large phytomass. This reflects a general tendency to overgrowth of shallow water - the formation of large thickets light demanding species.

Key words: macrophytes, biomonitoring, acid-base balance.

Forming symbiotic apparatus and crop chickpea depending on mineral power and inoculation seeds

G. Gospodarenko, S. Prokopchuk

This article touches upon the effects of pre-sowing seed inoculation and different doses of fertilizers on symbiotic system performance and yield of chickpea seeds on ash soils of Right-Bank Forest-Steppe of Ukraine.

Usually no natural soil native for chickpeas. Bean- rhizoid symbiosis is the result of matching genotypes macro- and micro-symbiosis.

One of the most important parameters of the intensity of atmospheric nitrogen fixing legume crops is the number of nodules on the roots of plants and their activity. Use active strains of rhizoid increased their number in all ways. Only a few are not inoculated chickpea plants formed a single, very large nodules that apparently fell from the seeds.

Today, the widespread use of drugs based on acquiring beneficial microorganisms which positively affect the growth, development and mineral nutrition of plants, can inhibit the development of pathogens, contribute significantly reduce pesticide load on the ground.

The problem of forming symbiotic system chickpea plants at different levels of mineral nitrogen supply and use of inoculation in the scientific literature revealed a very low volume, so further study of this question is relevant.

The study was conducted during 2011–2013 years in temporary experiment on the experimental field of Uman National University of Horticulture. Soil on the tested plots is hard clay black soil.

In the experiment cultivated chickpea variety Roseanne was used. Forms of fertilizers - ammonium nitrate, urea, double superphosphate, potassium chloride, ammonium molybdenum, ammonium sulphate. Limestone material - defecate, which application rate is calculated by hydrolytic acidity.

Phosphate, potash fertilizer and defecate were applied during autumn ploughing, nitrogen fertilizers - during pre-sowing cultivation and leaf nutrition - in the phase of bean formation of chickpeas. Before sowing the seeds were treated with suspension of Ryzobofit (specimen of nodule bacteria Mesorhizobium ciceri made from strain H-12 at the rate of 106 bacteria for a seed).

Found that pre-sowing seed treatment nutovoy Rizobofitom, fertilizing and defekatu normal $N_{60}P_{60}K_{60}$ was optimal for obtaining seeds chickpeas with temporal indicators symbiotic system. Inoculation of seeds Ryzobofitom on a background of mineral fertilizers and liming soil (option $CaCO_3$ + von + Mo + N_{30} + N_{30}) enhances the intensity increase plant biomass, which determines the amount of commercially valuable crops.

High yield of providing for liming, making $P_{60}K_{60}$ for plowing and starting dose of nitrogen fertilizer (30 kg/ha D.V.) during pre-sowing cultivation and inoculation of seeds. In chickpea yield also had a significant impact weather conditions during the growing season and agrotechnical methods that have been studied in interrogation.

In the Right-Bank Forest-Steppe of Ukraine hard clay black soil inoculation of chickpea seeds bacterial agents shall be binding agrotechnological measure. This is especially true of the fields where the chick had not grown. The effectiveness of inoculation increased by liming background (or use molybdenum) and make starting dose of nitrogen fertilizer (30 kg/ha D.V.).

Key words: chickpeas, fertilizers, seed inoculation, nitrogen fixation, symbiosis, yielding capacity.

Periodic vibroshock mode of motion of spherical particle on parabola arc

A. Zavgorodniy, Khessro Montaser

The scientists of the Kharkov Petro Vasylenko National Technical University of Agriculture have created special separators of vibrations for treatment of grain mixtures in selection and preparation of seed to sowing. High quality of separation on these separators is achieved due to the simultaneous use of complex of many properties of particles: resiliency, roughness, largeness, shape. However a high-quality division of mixtures is observed when motion on workings bodies (the surfaces of friction) takes place in a single layer. Then every particle can contact with a surface and exercise its properties in a maximal degree. Thus the increase of grain feeding and productivity of such separators to the level of sieve machines is not possible. The new method of division of corn mixtures of separation on the limited area of trajectory is used in which doesn't have these drawbacks. In addition, the fact that workings bodies of separator are produced compact and placed in greater quantity in the same volume multiplies their productivity. This effect is doubled, if the workings bodies are manufactured in the shape of a symmetric gutter with a curvilinear profile and adjusted with a reflecting plate in his middle part. Then grain feeding on every working body can be carried out in two streams.

The problem of choice of rational profile of working body is related to the study and comparison of features of motion of seed on his surface at the different form of transversal section: circumferences, parabolas, hyperbolae, and others. It causes the necessity of study of technological process of separation on the base of mathematical model of motion of seed on curvilinear surfaces. This problem is not well enough investigated in the scientific literature. This paper deals with the case when the section of working body has a shape of quadratic parabola.

Taking into consideration the forces affecting the grain, the system of differential equations of its motion is written down in the natural system of axes. The decision of this system is executed in the environment of Mathcad. Taking into account possibilities of symbols in Mathcad, the program was created for a case, when the type of working body has an arbitrary shape. To start this program it is necessary only to enter equation of the explored type as a user's function.

The technologically justified periodic mode of motion of corn particle without tearing away and slipping was explored. In this mode the time of motion of particles on the surface of working body between two successive accents on reflector is equal to the period of vibrations of mobile part of separator. It is shown that in the case of parabolic type of working body interruption of the indicated mode is mostly possible in area of maximum remove of particles from a reflecting plate, where a normal reaction takes on a minimum value.

The criterion of separation of mixtures is a scope of fluctuating motion of particles on working bodies. Resilient particles have a greater scope than unresilient ones. In addition, distribution of the masses within a particle (ratio of radius of inertia to the radius of particle) affects the scope. It proves the possibility of separation of particles according to their mechanical properties on working bodies with a parabolic profile.

The best effect of separation for the considered mode of motion of particles on a parabolic profile can be achieved under the intensity of vibrations close to the minimum possible. At the high rates of

intensity of vibrations the distinction in trajectories of motion of particles, having different features, disappears and that makes the separation of mixtures almost impossible.

Key words: small sounding board, reflecting surface, periodicity of motion, scope of vibrations of particle on the type of sounding board.

Improving winter wheat resistance to adverse environmental factors

L. Gonchar, P. Kovalenko

The results of studies of planting in autumn and winter frost, depending on fertilization and pre-treatment of seeds and heat indices resistance of winter wheat plants. Found that pre-sowing seed treatment of winter wheat by multi-component drug increased plant resistance to adverse environmental factors and increased grain yield.

Successful implementation of intensive technology of cultivation of crops depends largely on the improvement in plant resistance to adverse factors at the stage of seed germination and during the growing season. One of the effective ways of mitigating negative impact of stressors on plant productivity is handling growth regulators. For pre - seeding inlay seeds using compositions of which usually includes growth regulators, micronutrients, disinfectants, and other components.

Thanks to scientific advances there was created new plant growth regulators, which allow to regulate physiological processes in plants, increase the yield and quality of crops, realize the genetic potential of varieties at a high level, increase plant resistance to adverse environmental factors.

High temperatures are adverse factors faced by plants in natural conditions. Excess heat causes damage to the photosynthetic apparatus of cells, inhibits the operation of the files system. One way to resolve them would be to increase nonspecific resistance of plants is common adaptive mechanisms for the actions of stressors, helps to activate metabolism plant and ability to adapt to other possible stress effects. The success of such research depends on the elucidation of biochemical mechanisms underlying the adaptation

Purpose. To identify the most cold-resistant and heat-resistant varieties of winter wheat in field experiments and effective measures to reduce stress factors of the plant.

The methodology of the study. Experimental work was carried out during 2010-2012 year in a stationary chair plant belong to National University of Biotechnology and Environmental Sciences of Ukraine in Ukraine. (Kyiv Region).

To determine the heat resistance of the varieties the experimental work was carried out during 2008-2011 years on the territory of private farm "Rasavske" (Kaharlyk district, Kyiv Region) .

Determination of heat resistance of plants was carried out with the aid of " Turhoromir1".

Results and discussion. During the autumn vegetation observed morphological differences between plants depending on fertilization and a comprehensive drug Deimos. The key difference concerned the development of root system formation and intensity stems or passing tilling process.

Not only winter weather conditions prompted widespread winter survival of plants, but fertilizer and biological characteristics of the studied varieties. In this regard, there are products on the market to reduce the impact of external factors, one of which is «Antistress» .

Increasing climatic temperatures requires a new drought -resistant and high- temperature varieties of cultivated plants. However, for existing grades - it is necessary to improve farming practices that would help to improve heat resistance of plants. Winter wheat l withstands well high temperatures in summer. Mostly dry winds with increasing temperature to 35-40°C did not cause great harm, especially when adequate soil moisture.

Varieties that have been studied were not equally at high temperature. The most heat-resistant variety was Myronivska – 65 both fertilizer and in the control variant after soybeans. Which means that the resistance of plants affected by complex factors.

Now, with the increase of maximum temperatures during the summer growing season is important to improve heat resistance of wheat varieties. Optimization of the technological elements of winter wheat can increase the resistance of plants and increase productivity.

Key words: winter wheat, preplant treatment, frost, wintering, heat resistance.

Specialties of differentiation of plant height into generation inbred hemp plants (for example of a variety Zolotonoshskaya 15)

S. Mishchenko

Inbreeding is used very much in the most allogamy crops in the breeding and agricultural production today. Inbreeding increases dominant signs and eliminates recessive genes. Due to inbreeding we can find new forms in the populations of allogamy crops which are useful for humanity because they have recessive signs. Freely crosses populations have such signs in hidden form.

The main importance of inbreeding is creation of homozygous generation in a short time. An increasing productivity of plant on the basis of heterosis effect is a result of hybridization of inbred lines.

The problem of complex and comprehensive study of biological and selection signs of hemp (Cannabis sativa L.) inbred lines is very important. These studies were not conducted in full because of cytoplasmic male sterility is not found and inbred lines were not used to create heterotic hybrids.

Researchers have described different types of inbreeding effects on height of the stems of hemp plant. The height of the stems of hemp inbred lines were studied by Fruvirth C., Gorshkova L.M., Migal M.D., Laiko I.M., Sytnyk V.P., Vyrovets V.G., Kaplunova R.I. Dioecious and monoecious forms of hemp were studied.

We analyzed generations from self-pollination varieties of hemp Zolotonoshskaya 15. According to the information was received by us, some families have differentiation of plant height stem. This problem demands special study. The height of the stems is very important breeding sign. Harvest of stems depends on the height. Sign of stem height is positively correlated with technical height stems, which determines the yield of long fiber. Also a sign of stem height is positively correlated with the size of the inflorescence, which depends on seed yield.

The study was conducted from 2008 to 2010 on the basis of Research Station of Bast Crops of the Institute of Agriculture North-East NAAS of Ukraine (Glukhiv, Sumy region). The plants of monoecious hemp varieties of South eco-geographic type Zolotonoshskaya 15 were self-fertilization. It was done in a glass house. We used individual isolators which were made from agro fiber. Generations were studied by us. Area power of plants was 30 x 5 cm. Height was measured on living plants. Genetic and statistical parameters such as the arithmetic mean, error of the sample mean, minimum, maximum, fashion, median, average deviation, coefficient of variation, asymmetry, excess were installed..

The studies established the fact of differentiation of plant height into separate generation inbred hemp plants for example of a variety Zolotonoshskaya 15.

Normal distribution characteristics of plant height (E = 0.0) has all original forms (I0 Zolotonoshskaya 15). The coefficient of variation and error of sample mean increases in plants I1. In 2009, the height of the stems was from 128.5 to 185.9 cm (in the original form it was 160.9 cm). In 2010, the height of the stems was from 162.0 to 186.3 cm (in the original form it was 188.2 cm).

There is a differentiation of individuals in the low and tall plants in I1 Zolotonoshskaya 15 in many families. There are lines with different variability characteristics of the investigated parameters of asymmetry and excess of the empirical distribution of the curve, such as:

positive asymmetry and negative excess (A = 0,6, E = –0,7 in family number 771);

negative asymmetry and negative excess (A = –0,2, E = –0,6 in family number 772; A = –0,1, E = –1,6 in family number 788; A = –0,6, E = –0,2 in family number 636; A = –0,2, E = –1,0 in family number 640; A = –0,1, E = –1,2 in family number 652);

negative asymmetry and positive excess (A = –1,1, E = 2,1 in family number 799; A = –0,6, E = 0,4 in family number 659);

zero asymmetry and negative excess;

negative asymmetry and zero excess.

There was low and high value plant 1 : 1 in family number 788, 640 and 652.

Genetic and statistical indicators point to the complex genetics of plant height signs as a quantitative sign.

SLP 470 inbred lines were based on the variety of monoecious hemp Zolotonoshskaya 15. It has a valuable breeding signs such as:

overall height of the stems – 221.6 cm,
harvest of the stems – 1230 g/m^2,
technical length – 182.9 cm,
fiber content – 28.2%,
weight of thousand seed – 17.1 g,
drug compounds are absent.

There is the possibility of creation of inbred lines for a certain level of signs. There is also a possibility to these inbred lines to use in plant breeding through the use of statistical methods to assess variability and to establish whether the empirical frequency distribution of genotypes theory. Inbreeding and its extreme form of self-pollination is important analyzers of complex population of cross-pollination species of cultivated hemp.

Key words: hemp, inbreeding, self-fertilization, inbred lines, plant height, asymmetry, excess, breeding.

The peculiarities of the application of plant growth regulators in cultivation of coriander depending on different sowing terms in the conditions of the Forest-Steppe area of Ukraine

O. Filonova

The statement of the problem. The management of the process of vegetable yield formation is the most important problem of modern vegetable growing. In this regard, the important components of modern technologies in the production of vegetable products are plant growth regulators.

The duration of coriander seed consumption is limited to the terms of receiving of the yield and its safety. Therefore the elongation of consumption of this product is actual both for science and for the production. It is solved on the basis of elaboration of the measures of early products receiving and their yield-capacity increase. Among them the application of plant growth regulators and the selection of the sowing terms for specific climatic conditions stand in the foreground. That can not only increase the yield-capacity, but also improve the quality and extend the terms of the receiving of the green products by the consumers and increase its total output per unit area.

The purpose and the objectives of the investigation. The study and substantiation of the growth and development of coriander seed plants in different terms of sowing with the use of plant growth regulators and the establishment of the most effective ones in the right-bank Forest-Steppe area of Ukraine.

The proceedings and the methodology of the investigation. In 2011-2013 on the black sod-podzol soil of the right-bank Forest-Steppe area of Ukraine the investigations of the effectiveness of the plant growth regulators application and the selection of the optimum terms of sowing were conducted.

Coriander was cultivated in a non-seedling way with the application of the plant growth regulators Lignohumat and Emistim C according to the location scheme 45x8 cm and density 277,8 thousand units/ha. The seeds were sown in the third decade of March, in the first decade of April, in the second decade of April, in the third decade of April and in the first decade of May. The second decade of April was selected as the controlled one. The program of the investigation was supposed to conduct phenological observations, biometric measurements, accountings of the total yield-capacity and the quality of the products.

The results of the investigation and their analysis. The analysis of the data obtained in the result of the growth and development of coriander seed plants on the black sod-podzol soil of the right-bank Forest-Steppe area of Ukraine showed that from the emergence of the shoots to

the onset of the main phenological phases the shortest duration periods were in the term of late sowing, namely in the first decade of May.

While investigating the influence of the sowing terms and the plant growth regulators on the number of leaves of the coriander seed plant it should be mentioned that at harvest their number has doubled, from 3,3 – 4,5 pcs./plant to 6,3 – 8,1 pcs/plant for the application of Lignohumat and from 3,6 – 4,5 to 6,2 – 8,1 pcs/plant for the application of Emistim C.

The study of the influence of the sowing terms on the number of leaves on the plant revealed that during sowing of coriander seed in the third decade of March their quantity was higher, and regardless of the investigated variety reached a value of 8,1 pcs/plant. Fewer leaves formed the plants sown in the first decade of May.

It is proved that the greatest weight of the plant was obtained for the use of the early sowing terms. So, during the sowing in the third decade of March and in the first decade of April the weight of the plants for the use of Lignohumat on average in the years of the investigation has reached a rate of 11,3 – 11,6 g, which significantly exceeded the control variant 1,6 – 1,9 g. For the use of Emistim C accordingly the received weight was 9,5 – 9,9 g.

A basic assessment of the level of influence of the plant growth regulators and the sowing terms on the growth and development of the coriander seed plants is carried out according to the results of the analysis of the yield-capacity of the marketable green mass.

In average in the years of the investigation the highest level of the yield-capacity of the marketable green mass was obtained for the sowing of the seeds in the third decade of March – 2,8 – 3,3 tons/ha, lower level – for the sowing of the seeds in the first decade of May – 2,1 tons/ha. The analysis of the yield-capacity data showed that for the application of Lignohumat the level of the yield-capacity was higher than for the use of Emistim C, that allows to receive essential bonuses of yield-capacity 0,1 – 0,5 tons/ha.

Key words: plant growth regulators, sowing terms, biometric indicators, yield-capacity.

The effect of the sewage sludge of treatment plants on the main phenotypic characteristics of the wheat

V. Dubovy, M. Tabakaieva

Using of mineral fertilizers for wheat growing is the basic element of wheat growing technology. At the same time it is known that mineral fertilizers contain heavy metals which create ecological problems. Our researches on determination of agricultural chemistry features of sewage sludge enabled to examine it as an alternative to the mineral fertilizers.

The fertilizers are one of basic resources to increase the productivity of agricultural production. But insufficient national backlogs of mineral fertilizers and limited application of organic fertilizers require the searching of new optimal ways of terms of plants feed and recreation of soils fertility. In addition the production of mineral fertilizers has huge negative influence on the environment, such as harmful matters in the air and in the water, huge energy consumption and resources consumption, greenhouse gases and ect.

For example the production of 1 ton of ammoniac saltpeter is using 787 kg concentrated aquafortis, 3,7 kg concentrated sulphate acid, 214 kg concentrated gaseous ammonia, 0,8 $м^3$ water of and 31 kW/hour electro power.

Therefore the use of local raw materials is expedient for making untraditional organic fertilizers. Such as using sewage sludge of treatment plants compensates the entering of organic matter to soil, allows to increase the production of agricultural goods and decreases technogenic influence on an environment. The sewage sludge has individual chemical composition. Its are new and while insufficiently known, that why we need get more information about its using.

We researched the agricultural chemistry features of sewage sludge and its influence, as organic and mineral fertilizers, on the height of spring wheat of variety Izolda and

Myronivchanka in the vegetation conditions and winter wheat of variety Podolianka in the field conditions during 2012-2013.

The agricultural chemistry researches of moist and dry sewage sludge were conducted in the certificated laboratory of the Kyiv regional project-scientific station of chemistry in agriculture. It follows notices, that organic compounds, high maintenance of phosphorus, general nitrogen, potassium, neutral reaction show the high nourishing value of these fertilizers from the agronomical point of view.

We studied influence of different doses of sewage sludge on the height of winter and spring wheat in the field and vegetation experiments in 2012-2013.

The variety Izolda and Myronivchanka of spring wheat had a height 89,1 cm and 92,5 cm in variant where using sewage sludge in the dose of 20 tons/hectare.

Such spring wheat of variety as Izolda characterized by the less height, than plants of variety Myronivchanka. It is related to their different in physical and chemistry description. The plants of variety Podolianka of winter wheat got better results in variant where used 10 tons/hectare of sewage sludge (autumn using - 73,8 cm and spring using - 80,5 cm).

Previous researches enable to conclude, that the use of sewage sludge assists activation of growing processes of winter and spring wheat and becomes obvious to examine sewage sludge as a separate type of organic and mineral fertilizers and as an alternative mineral fertilizers, the production of which is chemically dangerous for the environmental.

Key words: sewage sludge, winter wheat, spring wheat, height of the plant.

The features of crop rotation in ground greenhouses and greenhouse of myroniv phytotron and greenhouse complex

V. Tkalych, V. Dubovy

Restoring soil fertility and maintain it at the proper level has been the main challenge in agricultural production. The importance of this issue is due to levels of soil fertility which is able to provide a stable yield and quality of agricultural products. Particularly acute is the issue of phytotron and greenhouse complexes, namely soil greenhouses and greenhouses by studying the dynamics of biotic and abiotic components of the soil, the value of which depends on soil fertility, yield and quality of agricultural production and use of these objects in the selection process without replacing them in the soil.

It is an important issue in phytotron and greenhouse complex. The research was devoted to the studying of the dynamics of biotic and abiotic components of the soil that affect on the soil fertility in greenhouses, yield and quality of agricultural products, and their use in the selection process without replacing them in the soil.

We used specific crops in ground greenhouses (oilseeds crops, grain crops, vegetables). The soil fatigue and reduce crop appeared in numerous recurring crops in the same place as in monoculture formed depleted microbial communities. The inactivation of microbial communities inhibits mineralization of organic matter and nutrient mobilization, leading to the accumulation of phytotoxic substances. The monoculture communities involve a number of representatives of pathogenic biota, such as microscopic nematodes.

The question about the soil fatigue in the field and in greenhouses is still researching and promoting an extensive study of the microbiological properties of soil and greenhouses.

Microbiological studies were carried out with fresh soil samples by soil dilutions method on tight and liquid culture media, guided by appropriate methods in the laboratory of soil microbiology of the Institute of Agricultural Microbiology NAAN.

The total number and the group composition of micro flora in soil samples account from the area of arable soil. N. N. Dzyubenko and E.A. Golovko (1977) noted that soil fatigue phenomenon can be removed only by the organic fertilizers in permanent crops of wheat. Soil fatigue under the field crops in monoculture is a natural phenomenon and may be due to the properties of soils and toxic substance

out of soil microorganisms during plant decay. Soil fatigue is based on a specific interaction between soil, plants and microorganisms. However, this question is still poorly understood .

The results of soil microbiological research are proving the points of view of authors that it is necessary to introduce the crop rotation, which provides an extension the period of the using soil in greenhouses and increase their profitability.

It is shown that the introduction crop rotation improves the biological activity of the soil, creates better conditions for intensive development processes related to the cycling of matter in the greenhouse soil, which promotes optimal growth and development of crops.

Key words: greenhouse, glasshouse, soil, crop rotation, phytotron greenhouse complex.

Soil zero tillage influence on its physical properties in the Right-Bank Forest-Steppe of Ukraine

V. Petrychenko, S. Kolesnik, O. Panasyuk, M. Yermolaev, V. Hahula

It is proved that a promising display of transition from traditional to soil protective and minimal cultivation technologies trend in agriculture is the zero tillage technology in which it is subjected to mechanical stress only in the area of the drills opener that makes a crack at sowing soil layer and places her seed there. The rest of the factors that may influence soils physical parameters are present in this technology, as well as in others.

Among the most important agrophysical parameters is soil density which can be regarded as an integral factor of its agrophysical condition. For the majority of crops on medium and heavy alumina soils optimal conditions for growth and development of crops consist in soil density ranged from 1 g/cm^3 to 1.03 g/cm^3, on sandy and semisandy - 1,20-1,50 g/cm^3.

The optimal density depends on soil type, grain size and biological characteristics of crops.

The 3-year research data on the influence of No–till cultivation technology for soybeans on its density and moisture reserves in soya-corn crop rotation are presented in the paper.

The obtained experimental results show that the density of the soil depends significantly on the methods of its cultivation, which is most notable in the complete germination of soya. In the mass germination the density of the soil under soybeans in 0-20 cm layer under traditional cultivation (plowing) made in 1.15 g/cm^3 in 2011, and 1.26 g/cm^3 in 2013, while in variant with using No-till cultivation technology the density increased, by 8.7 and 6.3 % respectively. A slight increase in the soil density was observed in these variants in soybean seed filling phase as well. Soil structure density increase in 0-20 sm layer was a result of 3 years (2011-2013) No-till technology which made 6.7% of the full germination period, and 3.1% in the phase of seed filling.

The average equilibrium bulk density is 1,1-1,25 g/cm^3 for typical chernozem, 1,35-1,4 g/cm^3 for loam and sod-podzol soils, 1.5-1.6 g/cm3 for sandy loam and sandy soils.

It has been experimentally proved that the density of the soil is much more influenced by mechanic cultivation than by natural processes. The density fluctuations range, influenced by changes in humidity and temperature, fluctuates in the range of 0.05 g/cm^3 in the natural conditions. Depending on the type of plant roots this range is somewhat wider ±0,20-0,30 g/cm^3. Under mechanical cultivation of medium or heavy loam chernozem it can reach 0.40 g/cm^3.

Most of soil cultivation processing methods aim at bringing the soil density to its optimum value - within 1,12-1,27 g/cm^3. The value of this index influences almost all water and physical soil properties: porosity, permeability, moisture, water supplies, soil resistance to erosion. Recompressing of soil from 1.30 to 1,45-1,55 g/cm^3 takes place due to the excessive use of the technology in the growing of field crops, lack of tillage minimization, which causes a dramatic reduce in crop yields and production costs increase.

It is proved that under No-till cultivation technology in soya fields in the 2 part soya-corn rotation the density in the plow layer (3.1 and 6.7 % on the average for 3 years) increases

slightly. Thus soil productive moisture stocks in this and deeper (20-40 cm) layer remain traditional.

Key words: zero-tillage, soil density, moisture stock, soya.

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